



**U.S. Department of the Interior  
Bureau of Land Management**

Tillamook Resource Area

March 10, 2000

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# **Powerline Dairy Timber Sale**

## ***Environmental Assessment***

OR-086-99-03

# ENVIRONMENTAL ASSESSMENT

## Powerline Dairy Timber Sale

[EA number OR-086-99-03]

March 10, 2000

USDI - Bureau of Land Management  
Oregon State Office  
Salem District  
Tillamook Resource Area  
Columbia County, Oregon

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### Abstract:

This environmental assessment discloses the predicted environmental effects of three action alternatives and one no-action alternative for federal lands located in Section 33 of Township 4 North, Range 3 West, Willamette Meridian. On March 10, 2000 the responsible official proposed to implement Alternative 2. This alternative would harvest approximately 2 million board feet of merchantable timber on approximately 88 acres, construct approximately 4,280 feet of semi-permanent or permanent road, reconstruct approximately 1,520 feet of semi-permanent or permanent road, mechanically decommission approximately 6,600 feet of road, and conduct post-harvest site preparation/planting. This alternative would be implemented no earlier than in Fiscal Year 2000. The proposed action would use primarily (approximately 60%) cable yarding logging systems with some (approximately 40%) ground based yarding. The purpose of implementing this alternative is to silviculturally treat areas managed by the Bureau of Land Management to help meet desired management objectives outlined in the *Salem District Record of Decision and Resource Management Plan, May 1995*.

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## 1.0 PROJECT SCOPE

For the reader's convenience, terms defined in the Glossary (chapter 6.0) are shown in ***bold italics*** the first time they appear within the text of this Environmental Assessment.

### 1.1 Project Location

The Powerline Dairy Project is a proposed timber sale, consisting of three treatment units totaling approximately 88 acres. It is located approximately 9 miles west of Scappoose Oregon, in Columbia County, on land managed by the Tillamook Resource Area of the Salem District, Bureau of Land Management (see Figure 1 - location map). The project area is approximately 16 miles northwest of Portland, Oregon in Township 4 North, Range 3 West, Section 33, Willamette Meridian. Access to the project is from the Scappoose-Vernonia Highway, Gunner's Lake Mainline Road and the Pisgah Home Road.

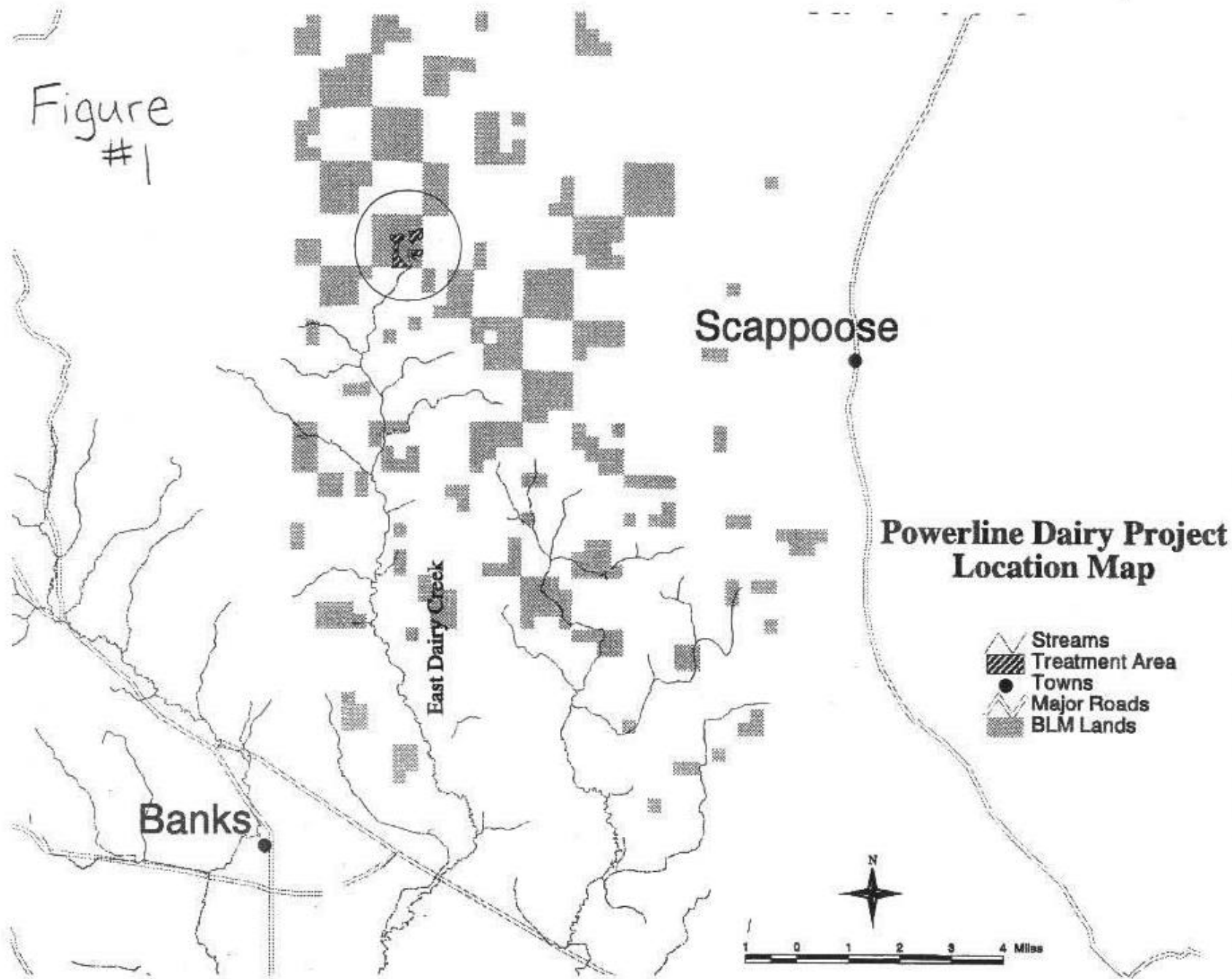
The proposed project includes a total of approximately 72 acres of a combination of commercial thinning and regeneration harvest located within the ***GFMA (General Forest Management Area)*** portion of the ***Matrix*** land use allocation, as identified within the *Salem District Record of Decision and Resource Management Plan* (RMP) dated May, 1995. The proposed project also includes thinning of approximately 16 acres of land within the ***Riparian Reserves*** land use allocation. The acres proposed for treatment are ***O&C Lands***.

The project area is within the East Fork of Dairy Creek drainage which feeds into the Upper Willamette River via the Tualatin River. Although the project area is not located within an identified Key Watershed for anadromous fish production, it does fall within the ***ESU (Evolutionarily Significant Unit)*** and designated critical habitat for Upper Willamette Steelhead and Upper Willamette Chinook, both species currently listed as threatened under the ESA (Endangered Species Act). In addition, haul routes associated with this project may fall within the Oregon Coast Coho Salmon ESU, the Lower Columbia River Steelhead trout ESU, the Lower Columbia River chinook salmon ESU, and the Columbia River chum ESU, all listed as threatened under the ESA, and the SW Washington/Lower Columbia coastal cutthroat trout, proposed for listing under the ESA.

The project is not within an identified rural interface area, a municipal watershed, nor in an area

designated as critical habitat for the marbled murrelet or spotted owl. There are no known domestic water supplies within the vicinity of the proposed action. Additionally, the project area is within the Class 4 Visual Resource Management category as identified within the RMP, which allows for major modifications of the existing character of the landscape. The 16 acres of forest within Riparian Reserve land allocation which are proposed for treatment are included within the stands identified to help meet the 15% S&G (Standards and Guidelines).

Figure  
#1



## 1.2 Background

The BLM's goal for this project is to have an ecologically appropriate, silviculturally driven treatment prescribed for the stands involved with this proposed project. That process began with a series of field trips by various resource specialists from the Tillamook Resource Area office to explore the potential for a silvicultural project within the area. The group recommendation was made that a project could be developed for the area, and that a viable timber sale which would help meet several RMP management objectives was possible. An **IDT (interdisciplinary team)** was formed with the intent of developing the proposed management recommendation(s) and to complete an **environmental analysis** of the proposed project in accordance with the **NEPA (National Environmental Policy Act)**. That environmental analysis is documented within this EA (environmental assessment).

This EA is intended to provide the Tillamook Resource Area Manager sufficient information for reaching an informed decision and determining whether an action may have significant environmental effects. Should the selected action(s) have significant environmental effects, an **Environmental Impact Statement** will be prepared. If the selected action(s) do not have significant environmental effects, a Finding Of No Significant Impact will be prepared.

The IDT has followed several documents which provide guidance and restrictions for managing forest ecosystems on a regional basis. The list of those documents includes the following: Salem ROD and RMP (*Salem District Record of Decision and Resource Management Plan*), dated May 1995; *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl*, dated April 1994; *Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl*, dated April 1994; and the *Dairy-McKay Watershed Analysis*, dated March 1999. Authority for this proposal is provided by the O&C Act of 1937 and the Federal Land Policy and Management Act of 1976. These documents are available for review at the BLM - Tillamook Resource Area Office, 4610 Third Street in Tillamook, Oregon.

## 1.3 Purpose and Need for Action

The Purpose and Need for action in the Powerline Dairy Project area by land allocation includes the following:

### 1.3.1 **Matrix Land Allocation**

**(Unit 33-1: approximately 22 acres):**

The Douglas-fir stand within unit 33-1 has a moderately stocked 70-year-old overstory with a poorly stocked 30-year-old Douglas fir understory. Aerial surveys for the root rot fungus *Phellinus weirii* were conducted within the area of the proposed project in the late 1980's. Those surveys, combined with a recent on-site evaluation indicate that this area is being severely impacted by the fungus at this time. It is estimated that approximately 80% of this unit is infected with *P. weirii* which destroys the



root systems of Douglas-fir and grand fir, reducing structural stability, root hydraulic function and timber volume production. Douglas-fir volume production in disease centers is typically less than one-half of that in healthy stands. The pathogen is a facultative saprophyte, and can persist on the site for at least 50 years in the roots and stumps of dead trees. The disease spreads when uninfected roots of a susceptible tree species come in contact with infected roots or stumps.

The desired condition is one which the treated stands have a decrease in the spread of *P. weirii*, and an enhanced current and future timber production capability. As such, it is proposed to treat infected areas with regeneration techniques and reforest with a mix of disease-resistant species such as redcedar, hemlock, red alder and bigleaf maple.

*Note:* Due to the potential negative impacts to the stability and vigor of susceptible tree species, the presence of *P. weirii* may limit both potential stand treatments and reforestation species compositions. Due to the high levels of *P. weirii* throughout this unit, thinning would not be effective and as such, is not a consideration.

(Matrix portions of units 33-2 & 33-3 totaling approximately 50 acres):

The Douglas-fir stands within the proposed units are 55 to 60 years old, densely stocked and currently not meeting their potential, in terms of individual tree growth and stand vigor, as well as in terms of the stand's future timber volume and value. Without treatment, the decline in growth rates, windfirmness, and general health and vigor of the trees within the stand would be expected to continue. The live crowns of the trees (that portion of the tree supporting green branches) would continue to decrease over time with suppressed trees eventually dying as a result of being out competed for available resources.

The desired condition is one which the treated stands have an improvement in general stand health and vigor resulting in increased tree diameter growth, crown development and windfirmness. This would help in producing a sustainable supply of timber, and providing connectivity and habitat for a variety of organisms.

#### **1.3.2 Riparian Reserve Land Allocation**

(portions of units 33-2 & 33-3 totaling approximately 16 acres):

A watershed analysis for the Dairy-McKay Watershed was completed in March of 1999 that identifies the Dairy Creek system as lacking in large woody debris, and that it may be beneficial to ecosystem health and function, and attainment of the **ACS (Aquatic Conservation Strategy)**

**Objectives** to conduct thinnings within Riparian Reserves to encourage rapid tree growth (a future source for large wood debris) and enhance the development of some features of late seral stage habitat. Unlike most of Dairy Creek, the stream channels in the vicinity of the proposed treatment areas currently appear to have an abundance of large legacy wood. Currently, the lower-slope riparian areas adjacent to the streams are generally developing in such a way that treatment is not currently recommended. The more upland or "outer portions" of the Riparian Reserves adjacent to

Units 33-1 and 33-3 are essentially the same as the adjacent stands within the Matrix/GFMA allocation, and are expected to develop in the same fashion as described for each unit in the absence of treatment. The more upland portion of the Riparian Reserve which is located within the northern edge of unit 33-2 is different from the adjacent Matrix lands in that tree diameters are smaller, the stocking level is greater within the Reserve than in the Matrix.

Within a few decades, the Matrix portions of units 33-2 and 33-3 may be considered for regeneration harvest. This is based upon management direction within the RMP (page 48) which states regeneration harvest within the GFMA land allocation would occur at or above an age which produces maximum average annual growth over the life of a timber stand. This generally occurs between ages 70 and 110 years of age. This eventual regeneration harvest would be expected to result in large amounts of blow down within the adjacent Riparian Reserves if the currently overstocked condition within the Riparian Reserve is maintained and stem stability continues to degrade. The likelihood of this potential blowdown is believed to be greatest in reserves located to the west and/or north of the units.

The desired condition is one where a diversity of later seral stage habitats are located within Riparian Reserves and where the portions of Riparian Reserve stands which are adjacent to the Matrix lands, and most susceptible to windthrow are relatively windfirm to minimize blowdown.

*Note:* Due to the high level of *P. weirii* in Unit 33-1 and portions of the adjacent Riparian Reserves, no thinning within the Riparian Reserve is proposed as there is a high potential that thinning would result in an increased rate of blowdown of trees within the Riparian Reserve by reducing the amount of support that adjacent trees are providing to each other.

### **1.3.3 Project Objectives**

By comparing the existing conditions of the landscape in and around the project area to the objectives for the Matrix and Riparian Reserve land allocations described within RMP, the IDT identified a number of specific resource conditions that do not meet the long-term management objectives. The proposed action is designed to modify these conditions, and to move toward achieving the objectives described within the RMP, pages 5-6, 9, 20. These objectives include, but are not limited to, meeting the Aquatic Conservation Strategy objectives, enhancing the future timber-producing capability of the GFMA lands, managing timber stands to reduce the risk of loss from disease, providing for the maintenance of ecologically valuable structural components such as down logs, *snags*, large trees, helping to meet the planned timber sale volume for the Tillamook Resource Area PSQ (Probable Sale Quantity), and helping to produce a sustainable supply of timber and forest commodities to provide jobs and contribute to community stability.

## **1.4 Proposed Action**

The proposed action is to implement a timber sale treating a total of approximately 88 acres using

commercial thinning and regeneration harvest techniques. It would include timber harvest on up to approximately 72 acres within the GFMA/Matrix land allocation (approximately 50 acres of thinning and 22 acres of regeneration harvest), and an additional 16 acres of thinning within the Riparian Reserve land allocation.

A more detailed description of the proposed action is located within Chapter 2.

## **1.5 Decisions to be Made**

Dana Shuford, Tillamook Resource Area Manager, is the responsible official who will make the following decisions:

Whether or not an Environmental Impact Statement is needed;

Whether to approve the silvicultural treatment and associated actions as proposed, not at all, or to some other extent.

## **1.6 Issues and Units of Measure**

In compliance with NEPA, the proposed action was listed in the June, September, and December 1998, March and June 1999 and in the February 2000 editions of the quarterly *Salem District Project Update* which was mailed to over 1,000 addresses, and a letter and scoping report (Project Record document 14) was mailed on December 16, 1998 to 125 potentially affected and/or interested individuals, groups, and agencies (Project Record document 16). A total of six letters and two oral responses were received as a result of this scoping effort. All public input was assigned a number and filed within the Project Record (Project Record documents 17-24). The IDT reviewed, clarified, and assessed the public comments. The disposition of those comments are contained in Appendix 1.

Considering public comment, the IDT identified only one major issue, Soil/Water, which will be the focus of this environmental analysis. Chapter 3 will also contain a discussion of the other three standard elements of the environment (i.e., vegetation, wildlife, and fisheries) which were not identified as major issues but are subject to environmental analysis. Additionally, the major issue and the other standard elements of the environment are associated with a specific unit of measure. The units of measure were selected to evaluate issue resolution (i.e., soil/water issue), evaluate attainment of project objectives and/or describe environmental impacts.

### **1.6.1 Soil and Water** (major issue; defines the scope of environmental concern for the proposed action and used to formulate alternatives contained in Chapter 2)

The proposed action (e.g., primarily the use of ground-based equipment and the construction of *roads*) would result in soil disturbance/compaction which may increase sedimentation, decrease soil productivity, and may have short- and long-term impacts on hydrology.

proposed action and used to formulate alternatives contained in Chapter 2)

The proposed action (e.g., primarily the use of ground-based equipment and the construction of **roads**) would result in soil disturbance/compaction which may increase sedimentation, decrease soil productivity, and may have short- and long-term impacts on hydrology.

The unit of measures selected include: acres of **soil compaction**; length of road constructed, reconstructed, and/or decommissioned; and narrative of the effects of an action on water quality, soil productivity and hydrology.

### **1.6.2 Vegetation**

Vegetation resources have been divided into three categories to facilitate analysis. These categories include special status species, noxious weeds, and forest vegetation (within Riparian Reserve and Matrix land allocations). The unit of measure is a narrative and/or acres treated.

### **1.6.3 Wildlife**

The unit of measure selected for each wildlife species listed or proposed under the ESA (Endangered Species Act) is a narrative that describes whether or not there would be: (a) no effect, (b) may affect, beneficial, (c) may affect, is not likely to adversely affect, or (d) may affect, is likely to adversely affect. The unit of measure selected for wildlife species included in the Special Status Species policy covered under BLM Manual 6840 is a narrative that describes whether or not there would be a trend toward federal listing or loss of population viability. The unit of measure selected for other wildlife species of concern is a narrative.

### **1.6.4 Fisheries**

The unit of measure selected for fish species listed or proposed under the ESA is a narrative that describes whether or not there would be: (a) no effect, (b) may affect, is not likely to adversely affect, or (c) may affect, is likely to adversely affect. The unit of measure selected for designated Critical Habitat for fish species listed under the ESA is a narrative that describes whether or not there would be “no effect” or “may affect”. An additional unit of measure is consistency with ACS objectives. The unit of measure selected for fish species included in the Special Status Species policy covered under BLM Manual 6840 is a narrative that describes whether or not there would be a trend toward federal listing or loss of population viability.

(Note: Although candidate species are afforded no protection under ESA, the Bureau considers it prudent to consider the Oregon coast sea-run cutthroat and Oregon coast steelhead in this environmental analysis in the event they become proposed and/or listed under ESA).

In addition to the required “no action” alternative, the IDT formulated seven preliminary alternatives to the Proposed Action which would address the major issue raised by the public during scoping. The IDT assessed those preliminary alternatives and dropped five of them from detailed study. The finalized list of alternatives to the Proposed Action includes a “no action” alternative and two action alternatives (i.e. Alternative 3 - cable yarding only, and Alternative 4 - helicopter yarding) that address the major issue (soil and water) and wholly or partially fulfill the purpose and need for action (Chapter 1).

## **2.2 Alternatives Dropped From Detailed Study**

The following potential alternatives to the proposed action which may have resolved the identified major issue were dropped from detailed study for the reasons described below:

1. Maintain the same treatment units and harvest methods as in the proposed action however decommission a sufficient amount of additional roads within the project area to offset the impacts of the 4.6 acres of new disturbance and/or compaction resulting from the proposed action and thereby resolve the identified soil/water issue.

This alternative was dropped after preliminary survey of the project area revealed that there is an insufficient amount of roads within the project area which could be decommissioned to offset the expected short and long term impacts associated with the proposed action and thereby resolving the major issue.

2. Relocate and redesign the roads accessing units 33-1 and 33-2.

Relocate the portions of the roads accessing unit 33-1 and 33-2 which would be constructed on BLM land within Riparian Reserves to a location outside of the Riparian Reserves. This alternative was dismissed based upon the fact that moving the roads out of the Riparian Reserves would move the road placement off the ridgetops and result in side-hill construction, potentially resulting in greater impacts and therefore not resolve the soil/water issue.

Redesign that portion of the road accessing unit 33-2 which would be constructed on private land to take the shorter, more direct route thus result in less road construction. This alternative was dismissed based upon the fact that it would result in a much steeper road, move the road placement off the ridgetop and result in side-hill construction, potentially resulting in greater impacts and therefore not resolve the soil/water issue.

3. Implement the project however incorporate design features which result in no *new road construction*.

Primarily as a result of public comment, an alternative utilizing a combination of cable or ground based yarding systems which involves no new road construction was examined. Winching logs to existing roads, while also avoiding **road reconstruction** or the construction of any new skid trails, would basically enable thinning operations to occur only on approximately 40% of the area proposed for ground-based yarding within unit 33-3; units 33-1 and 33-2 would totally be dropped from treatment. This equates to approximately 8 or 9 acres, or less than 10% of the area proposed for treatment under the proposed action, being treated under an alternative of no new roads. Such an alternative was dropped from further consideration based upon the determination that treatment of such a small portion of the proposed action area was not responsive to the purpose and need for action, as well as the fact that the marketability of such a proposal would be questionable.

4. During the development of the Powerline Dairy Project, several logging systems were considered (cable, ground-based skidding, helicopter, horse, balloon). In consideration of public comment (i.e., identification of Soil/Water major issue), the preliminary environmental effects, and economic feasibility (project record document #36), the responsible official selected three yarding methods for detailed analysis. These include a combination of both cable and ground-based yarding systems (alternative 2), a 100% cable yarding system (alternative 3), and a helicopter yarding system (alternative 4). The reasons for dropping the other logging systems from further consideration follow:

- (4a.) Horse logging was determined to be infeasible within the majority of the areas being considered for treatment. This is based upon the fact that the average slope of the proposed harvest units is generally greater than 10% which is considered to be the maximum slope for horse logging.
- (4b.) Balloon logging was determined to be infeasible based primarily upon the facts that the necessary equipment is largely unavailable and few logging companies within the region have experience with the technology. Proximity of the electric powerline raised additional safety concerns associated with balloon logging.

5.A “restoration alternative” as suggested by the American Lands Alliance (Project Record, Document 22 and 25). (See appendix 1 - document 22, comment 1)

During public scoping, it was suggested that the BLM “include at least one alternative that contemplates restoration in favor of commercial timber harvest.” It was determined that the suggested restoration alternative was not responsive to the purpose and need for action in that it would not partially or wholly meet the purpose and need for action. (i.e., decrease the spread of *Phellinus weirii*, enhance the future timber production capability of the area, and improve individual tree growth and stand vigor). As such, the alternative is outside the scope of this analysis. (See APPENDIX

1 for further discussion)

## **2.3 Alternatives Considered in Detail**

### **2.3.1 Alternative 1 (The “No Action” Alternative)**

For this EA the no action alternative is defined as not implementing any of the proposed forest management practices in the Powerline Dairy Project area contained in Alternatives 2, 3 and 4. There would be no commercial thinning, regeneration harvest, new road construction, reconstruction of existing roads, nor legacy roads decommissioning (including log culvert removal) at this time. The local plant and animal communities would be dependent on and respond to ecological processes that would continue to occur based on the existing condition.

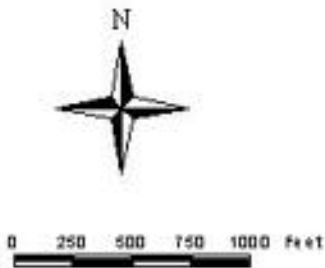
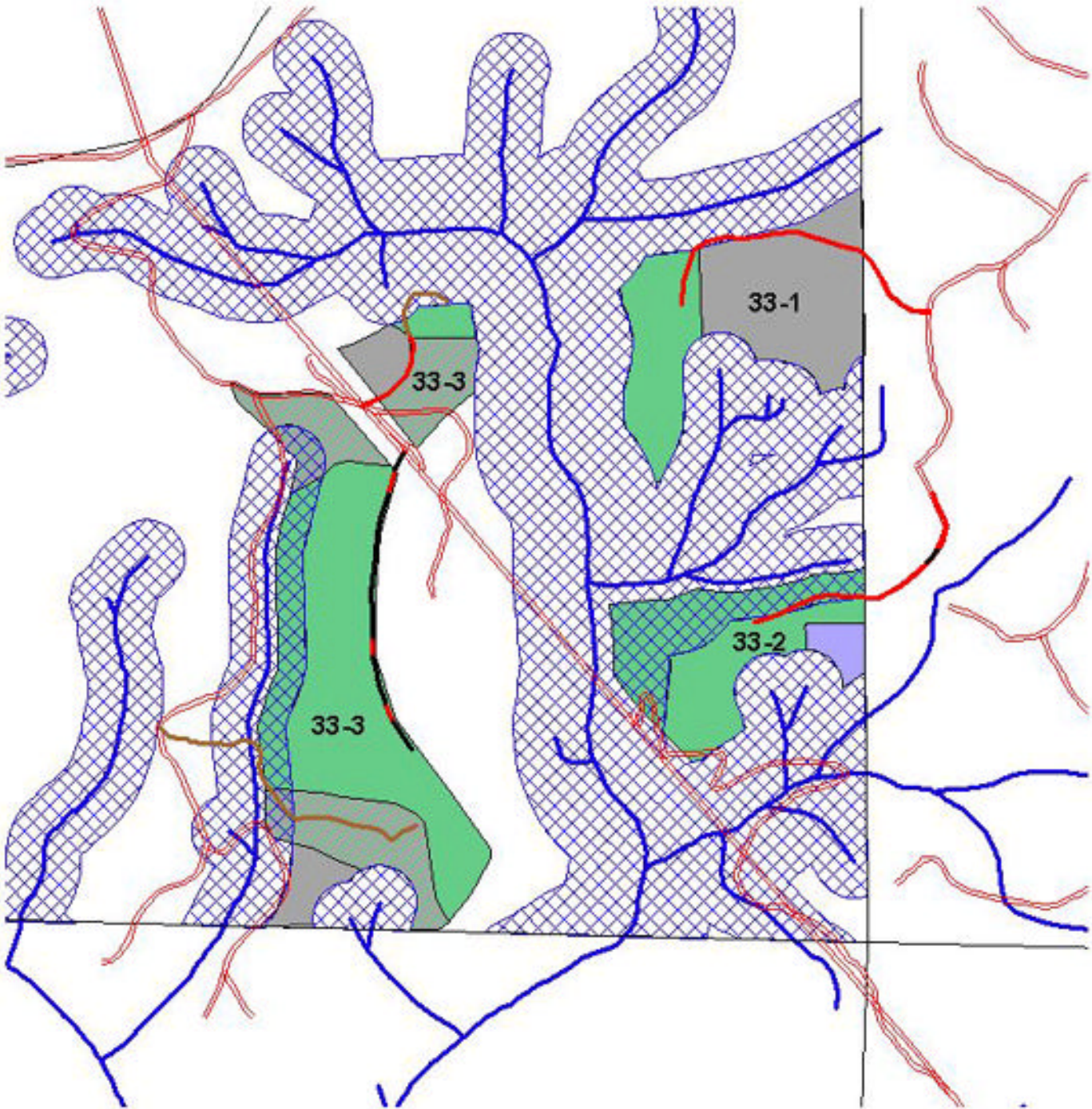
The No Action alternative would serve to set the environmental baseline for comparing effects of the action alternatives.

### **2.3.2 Alternative 2 (The Proposed Action)**

The proposed action is to implement a timber sale using a combination of commercial thinning and regeneration harvest techniques. It would include timber harvest on approximately 72 acres within the GFMA/Matrix land allocation, and an additional 16 acres of thinning within the Riparian Reserve land allocation. Approximately 54 acres of the harvest would be accomplished by utilizing a cable logging system and 35 acres would be accomplished by a ground-based system. The units and logging systems described within the Proposed Action are depicted on Figure 2 - Map of units and logging systems for Alternative 2. Approximately 22 acres of *P. weirii* infested timber would be regeneration harvested and reforested with tolerant and non-susceptible species. This would occur within a single unit (unit 33-1). In addition, approximately 66 acres would be commercially thinned within two units (units 33-2 and 33-3). Approximately 50 acres of thinning would occur within the Matrix land allocation and 16 acres would occur within Riparian Reserves. The project is expected to be implemented (sold) during FY 2000 or 2001 and result in the production of an estimated 1.975 **MMBF** (million board feet) of commercial timber products (see table 1). The Best Management Practices contained in Appendix C1 through C8 of the Salem District RMP as amended, would be part of the design criteria of this proposed timber sale.



Figure 2  
Powerline Dairy - Alternative 2  
Proposed Action



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Legend

Riparian Reserve

Stream Habitat Area

Logging Systems - Proposed Action

Cattle

Ground Based

Ground Based or Cattle

Road Activity

New Road Construction

Road Reconstruction

Road Obliteration



No warranty is made by the Bureau of Land Management for use of the data for purposes not intended by the Bureau of Land Management.



**Table 1. Harvest Units Information.** This table summarizes the harvest units information for the Proposed Action. Stand information and harvest volumes are estimates based on preliminary unit examination.

HARVEST UNIT(s)	TOTAL ACRES	STAND BIRTH DATE	LOGGING METHOD	STAND TREATMENT	% BASAL AREA REMOVED	% TREES REMOVED	ESTIMATED HARVEST VOLUME (board feet)
33-1	22	1930	About 8 acres cable and 14 acres ground-based	Regeneration Harvest retaining up to approx 20 trees/acre for wildlife trees, snag recruitment & CWD.	67	86	800,000
33-2	16	1930	The entire unit, 16 acres cable logged	Commercial thinning with emphasis on retention of the larger trees. Some small patch cuts in Matrix to control <i>P. weirii</i> infestations. The proposal includes thinning of about 8 acres of Riparian Reserve.	42	46	275,000
33-3	50	1930	About 30 acres cable and up to 21 acres ground-based	Commercial thinning with an emphasis on retention of the larger trees. The proposal includes thinning of about 8 acres of Riparian Reserve.	41	40	900,000
<b>Totals</b>	<b>88</b>						<b>1,975,000</b>

As currently proposed, specific design features of the project would help meet the management objectives contained within the Salem District ROD and RMP and are in compliance with the restrictions and guidance contained within the Northwest Forest Plan. These design features are as follows:

*(NOTE: These design features are provided for impact analysis purposes and are assumed to be implemented in the majority of the project area. Some of the design features may be modified during the layout phase of the project should actual on-the-ground conditions warrant, and if determined by the responsible official to be*

*consistent with the Project Objectives identified within Chapter 1.3.3 and within the scope of the analysis contained in Chapter 3. As appropriate, changes to the design features during the layout phase will be tracked and documented in the Project Record in order to demonstrate they are consistent with project objectives and within the scope of the analysis.)*

#### 2.3.2.1 Design features common to both regeneration harvest and commercial thinning treatments:

2.3.2.1.1 Ground-based yarding areas (slopes less than 35%): Ground based yarding is currently proposed for approximately 35 acres (39% of the sale area). Ground based operations would be conducted in such a manner as to assure that associated impacts would not exceed those allowed under the Best Management Practices identified in the Salem RMP (Appendix C-2).

- \* Skid trails and ground-based yarding equipment would generally be prohibited within Riparian Reserves. Exceptions would be the use of winch cable, where logging equipment is able to be operated from an existing road or where it is necessary to access the ground-based yarding area in the southwest corner of unit 33-3.
- \* Utilize existing skid trails to the greatest extent possible.
- \* Space new skid trails a minimum of approximately 150 feet apart and generally limit their width to less than 14 feet.
- \* Crawler tractors would be restricted to designated skid trails. If a track-mounted shovel loader is used for yarding, it would be restricted to designated skid trails except in instances where logs can not be reached from skid trails.
- \* Track-mounted shovel loaders used for yarding will not exceed a ground pressure rating of 6 p.s.i..
- \* Log lengths would be limited to 40 feet plus trim to reduce damage to the reserved trees during yarding operations.
- \* Restrict ground-based yarding to periods of low soil moisture (generally from June 15 through October 15).
- \* If the purchaser chooses, proposed ground-based yarding areas may be cable yarded provided that the measures discussed within the cable section below (2.3.2.1.2) are met.
- \* If the Purchaser chooses, proposed ground-based yarding areas may be cut and yarded by a harvester\forwarder type equipment provided that the following measures are met:
  - a. Except for manually felled trees which exceed the harvester capability, timber shall be felled, limbed, bucked, and bunched by a self-propelled, mechanical, track-mounted or rubber-tired harvester with a minimum boom reach of 27 feet using a single grip harvesting head. The harvester shall have a ground pressure rating of 6 psi (pounds per square inch) or less.
  - b. The forwarder shall be all wheel drive, capable of self-loading and unloading, and have rear tires or track type devices greater than 18 inches in overall width. Log

forwarders with GVWs (Gross Vehicle Weight) greater than 15,000 pounds shall have a minimum of three load-bearing axles.

- c. The location of the harvester trails shall be marked on the ground with flagging by the Purchaser and approved in writing by the Authorized Officer prior to felling and forwarding operations.
- d. Forwarding operations would be restricted to trails approved by the Authorized Officer. Forwarding trails would not exceed an average of 15 feet in total width, and would not be closer than 100 feet, center to center, where parallel trails are used.
- e. To minimize soil compaction and displacement, equipment shall be confined to existing skid trails and main roads as much as possible, minimize the number of forwarder passes, and the created slash from limbing and bucking shall be placed onto the skid trails for the harvester and forwarder to walk on.
- f. Restrict ground-based yarding to periods of low soil moisture (generally from June 15 through October 15) or during any period of wet soil conditions as determined by the Authorized Officer.
- g. Yarding shall be done with equipment capable of lifting and carrying logs fully suspended off the ground.
- h. Log landings and transfer points shall be limited to existing roads and turnouts, unless otherwise agreed to by the Authorized Officer.
- i. Harvester roads shall not exceed an average of 15 feet in width, nor be spaced less than 50 feet apart (from center to center).

2.3.2.1.2 Cable yarding areas (generally slopes exceed 35%) Cable yarding is currently proposed for approximately 54 acres (61% of the sale area). Cable yarding operations would be conducted in such a manner as to assure that associated impacts would not exceed those allowed under the Best Management Practices identified in the Salem RMP (Appendix C-1 and C-2).

- \* Space skyline corridors no closer than 150 feet apart at one end and limit the width of each skyline corridor to a maximum average of 12 feet.
- \* All yarding would be done with an intermediate support capable carriage equipped skyline system which is capable of yarding 2,000 feet slope distance from the landings with at least one end log suspension and laterally yarding at least 75 feet from the skyline corridors.
- \* The number of landings and their size would be kept to a minimum required to reasonably harvest the units. Landings would be located by the purchaser and approved by the BLM. Landings would be constructed 150-200 feet apart. In general, the maximum size landing would be 80 feet in diameter.
- \* Hand water bar cable yarding corridors immediately after use where extensive gouging occurs as determined by the Authorized Officer.
- \* Where possible, retain unmerchantable tops and limbs within the treated stands. Trees

intended to be retained for down woody debris would be felled contour to slope where possible.

- \* In areas where cable corridors converge, shade tolerant species such as western hemlock, western redcedar, grand fir and/or bigleaf maple would be planted, providing environmental conditions would allow sustained growth. If *P. weirii* is present, grand fir and hemlock would not be planted.

2.3.2.1.3 Retain and protect all existing snags and downed logs - **CWD (Coarse Woody Debris)** with the exception of those necessary to be cut and/or moved for reasons of safety. Cut snags would be retained as CWD. As appropriate, larger, “higher quality” snags and green wildlife trees would receive added protection by clumping up to approximately 3 to 5 green retention trees in direct proximity.

2.3.2.1.4 The project would involve approximately 4,280 feet of road construction of which approximately 360 feet could be rocked and considered to be permanent; the remainder would be considered **semi-permanent**. In addition, the project involves the road reconstruction of an additional 1,520 feet of existing natural surface road; approximately 1,340 feet of this reconstruction involves the rocking of existing natural surfaced roads after which it will be considered to be **permanent road** (see table 2). In addition the project would result in the designation/construction of approximately 11,000 feet of skid trails. Skid trails plus landings would be limited to less than 10% of the harvest units. All road construction, reconstruction and maintenance would be conducted in accordance with Best Management Practices as amended (RMP Appendix C-2 to Appendix C-6).

<b>Table 2. The amount (linear feet) of new road construction, reconstruction of existing roads and road decommissioning which would result from implementing Alternative 2 - The Proposed Action.</b>					
Proposed Action	New Road Construction	Reconstruct	Mitigation Measures	Decommission	Net
<b><i>Unit 33-1</i></b>					
Construct new natural surface road* on bench top across private land to access the unit.	700		Subsoil, waterbar and block road; replant Douglas fir	-700	0
Construct new natural surface road* on BLM land; Approximately 75 to 250 feet on ridgetop within Riparian Reserve.	1,400		Subsoil, waterbar and block road	-1,400	0
<b><i>Unit 33-2</i></b>					
Reconstruct natural surface road* on private land to access unit; install temporary culvert in swale.		180	Subsoil, waterbar and block road	-180	0
Construct new natural surface road* across ridge on private land.	660		Subsoil, waterbar and block road	-660	0
Construct new natural surface road* across ridge on BLM; Approximately 600 feet on ridgetop within Riparian Reserve.	660		Subsoil, waterbar and block road	-660	0
<b><i>Unit 33-3</i></b>					
Construct new natural surface road* on bench on BLM in NE corner of unit.	500		Subsoil, waterbar and block road	-500	0
Reconstruct and rock existing permanent ridge road on BLM land; rock will allow for winter hauling. Do not subsoil based on natural rockiness of substrate.		1,340	Block road; stabilize and waterbar if needed	0	1,340
Construct, including rocking, new permanent rocked road on southern portion of ridge on BLM land.	360			0	360
Decommission "legacy" road on bench and ridgetop within NE corner of unit.			Subsoil, waterbar and block road	-400	-400
Decommission "legacy" road on bench and ridgetop within southern portion of the unit; Remove the fill over log culvert on perennial stream.			Subsoil, waterbar and block road	-2,100	-2,100

<b>TOTAL</b>	<b>4,280</b>	<b>1,520</b>		<b>-6,600</b>	<b>-800</b>
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\* Semi-permanent roads that may be used for longer than one dry season but are decommissioned by the end on the contract.

- 2.3.2.1.5 The widths of the road clearing limits will vary but in general they will be as narrow as practicable while still allowing the safe passage of log trucks, and considering the protection of the roots of reserve trees. Clearing limits are measured between the tree trunks of reserve trees with clearing limits being wider at landings, around curves and near turnouts. Running surfaces would generally be about 12 feet wide, with a minimum of 3 feet from the edge of the running surface to the outside edge of the clearing limit. On “straight-a-ways”, clearing limits would typically be approximately 18 feet wide for natural surfaced roads and approximately 22 feet for rocked roads.
- 2.3.2.1.6 Road construction and reconstruction would be restricted to periods of low soil moisture (generally from June 15 through October 15) in order to limit the potential for surface runoff and erosion. Road construction would be terminated at the discretion of the Authorized Officer as necessary for weather conditions which may cause sediment runoff.
- 2.3.2.1.7 All natural-surfaced roads and landings constructed with the intent to lay over through the winter (semi-permanent) would be seeded with a sterile/annual or native seed mix in areas prone to erosion as directed by the authorized officer. Such roads would be water barred as necessary. Cut banks, ditch lines, and other areas determined by the Authorized Officer to need stabilization would also be seeded with a native or sterile annual seed mix. Seeding would be prior to October 15 each year.
- 2.3.2.1.8 Road decommissioning, road closure and skid trail obliteration:  
(See table 2)
- \* Following harvest, all natural surface roads and landings which are used to implement this project would be decommissioned by decompacting the road surface (subsoiling), removing of culverts, reestablishing the natural channel, water-barring where appropriate, and blocking to vehicular traffic. Road decommissioning would take place during period of low soil moisture, generally between June 15 and October 15 (in-stream work, unless waived by ODFW, would occur between June 1 and September 30).
  - \* Two additional “legacy” roads (totaling approximately 2,500 feet) within the project area have been identified for decommissioning (see Figure 2). The road surfaces would be decompacted, the fill associated with the existing log culvert would be removed reestablishing the natural channel, water-bars installed where appropriate, and they would be blocked to vehicular traffic.
  - \* Following harvest, all skid trails within unit 33-1 which are determined by the hydrologist to be affecting the hydrologic function of the watershed would be decommissioned by decompacting the trail surface (subsoiling) and if needed, water-barring and blocking to vehicular traffic. Within the thinning units (33-2 and 33-3), skid trails would not be subsoiled to avoid damaging the roots of reserve trees however if

- necessary, they may be blocked and/or water-barred.
- \* Cuts, fills and other disturbed areas would be seeded with a native grass seed mix or sterile annual seed mix prior to October 15 the same work year. This would help reduce the potential for erosion and the spread of noxious/exotic weeds. A site evaluation for other native plantings would be conducted as appropriate.
- \* After use, block the rocky permanent ridge road within unit 33-3; stabilize and waterbar if needed.

2.3.2.1.9 Design features to minimize or eliminate potential impacts to S&M fungal species located within or near the proposed action area would be incorporated where appropriate. These features would include the following: 1) Providing a protection buffer with a radius of 40 feet from the approximate site of *Cudonia monticola* identified within unit 33-2. Within this buffer thinning would be permitted but the construction of yarding corridors would be prohibited. 2) Providing a circular protection buffer of 1 - 2 standing, live, overstory trees around the site of *Sarcosoma mexicana* in unit 33-3; minimizing soil, litter and CWD disturbance within this buffer by preventing logging activities, including fire and the dropping of trees into this buffer. 3) A one site tree potential height radius no-entry buffer shall be placed around the western most *Otidea onotica* site. 4) A 75 foot radius buffer shall be placed around the eastern most *Otidea onotica* site or two smaller radius buffers (50 to 70 feet) shall be placed around each of the eastern sites.

Subsequent S & M fungus surveys would be conducted in units 33-1 and 33-2 in accordance with the *Final Supplemental Environmental Impact Statement For Amendment to the Survey and Manage, Protection Buffer, and other Mitigating Measures Standards and Guidelines* (expected summer 2000). Any newly discovered sites would be managed appropriately, (e.g. with consideration to the management recommendations contained within Appendix J-2 of the NFP) to avoid adverse impacts. If additional surveys and subsequent mitigation result in substantial change to the proposal, a supplemental analysis will be conducted in accordance with NEPA and released to the public for comment.

2.3.2.1.10 Waste and hazardous materials would be handled in accordance with Section 25, 26 and 27 of the timber sale contract (BLM Form 5450-3). In summary, these sections address watershed protection including water quality, erosion control and soil damage; refuse control and disposition of waste materials; and the proper storage and handling of hazardous materials. Site monitoring for solid and hazardous waste will be performed during the performance of this work in conjunction with normal contract administration. Any spills or releases resulting from operations shall be subject to the District Hazardous Materials Contingency Plan. All fueling and storage locations of fuels, lubricants, and any other toxic materials will be located outside of Riparian Reserves and in an area where the material will be contained and prevented from entering surface water.

2.3.2.1.11 Prior to entering the sale areas each work season, or before returning to the watershed after leaving it, any heavy machinery including but not exclusive to logging machinery and road construction machinery (with the exception of log trucks and pickup trucks used for

daily personnel transport) would have all dirt and adhering vegetation cleaned from it to prevent the spread of noxious and/or invasive exotic weeds. Mechanically propelled brush cutters would be spray washed to remove all adhering weed seeds, vegetation and dirt prior to moving into the action area. Machinery would not be washed in an area where runoff could flow into adjacent streams.

- 2.3.2.1.12 If the quantity of slash at the landings is sufficient and accessible, it would be made available for public firewood removal permits following the completion of operation. Landing debris may be burned if it is determined by the BLM to be a fire hazard. Logging debris within the treatment units is generally not expected to be of such a volume as to create a fire hazard or inhibit reforestation however, if accumulations of slash warrant, some material within the regeneration harvest would be hand-piled and burned.

**2.3.2.2 Design Features for the Regeneration Harvest Area:** (unit 33-1, approximately 22 acres)

- 2.3.2.2.1 Sufficient green trees (generally larger than 15" *DBH - Diameter at Breast Height*) would be retained to supplement existing snags to a total of at least 2 snags per acre. The unit would be evaluated approximately 3 years after harvest and if necessary, some or all these trees would be converted into snags at that time, or at other points into the future.
- 2.3.2.2.2 Retain 6 green conifer trees per acre for use by wildlife. To the extent possible these trees would include the larger trees in the stand but smaller trees would also be reserved in order to retain trees with characteristics desirable to wildlife (broken or forked tops, hollow cavities, large crowns), as well as to adjust spacing and species mix, or to provide added protection to existing snags or CWD.
- 2.3.2.2.3 Sufficient material (either logs or standing trees) would also be retained to supplement existing CWD to a total of at least 240 linear feet of logs per acre which are greater than 20 inches in diameter at the large end and in decay class 1 or 2. Where insufficient numbers of 20 inch trees are available, the next largest size class would be used to fulfill this requirement.

A post-harvest CWD evaluation would be conducted approximately 3 years after harvest, and if it is determined as necessary to best meet CWD objectives, some of these trees would be felled for CWD at that time, or left to grow and felled for CWD at other points in the future. Trees felled for down woody debris would be felled contour to slope where possible.

- 2.3.2.2.4 It is estimated that up to approximately 20 green trees per acre would be reserved to supply the snag, wildlife and coarse woody debris requirements, distributed as noted in 2.3.2.2.1 through 2.3.2.2.3 above. Any of these reserve trees which should need to be cut for operational or safety reasons would be retained on site. Attempts would be made to distribute these reserve trees throughout the unit in that there would be no gaps larger than a few acres without a reserve tree, however because of the extensive occurrence of root



disease within the stand and the silvicultural objective to reforest these areas with disease-resistant species, the location of retained, susceptible tree species would largely be dictated by the distribution of the disease. Because disease resistant tree species would be favored for retention within the root rot pockets, this could result in a rather clumpy or uneven distribution of the reserve trees. Generally, reserve trees would not be located within approximately 30 or 40 feet of a Riparian Reserve boundary.

- 2.3.2.2.5 Based upon the small number of hardwoods within the unit and to provide for diversity, all merchantable-sized hardwoods would be reserved.
- 2.3.2.2.6 All non-merchantable conifer tree species which are non-susceptible to root disease (primarily cedar) would be reserved.
- 2.3.2.2.7 Following harvest, reforestation would be accomplished primarily with a mixture of western redcedar, red alder and bigleaf maple. Site preparation would be accomplished by slashing all non-conifer vegetation to a height of six inches or less.
- 2.3.2.3 **Design Features for the Commercial Thinning Areas:** (units 33-2 & 33-3, totaling approximately 66 acres)
  - 2.3.2.3.1 Conduct a commercial thinning in two harvest units totaling approximately 66 acres, with an emphasis on retaining the larger trees in the stand and those with crown ratios exceeding 35%. Thin stands down to a uniformly distributed residual basal area of approximately 130 to 150 ft<sup>2</sup> per acre.
  - 2.3.2.3.2 All felling and yarding activities would be prohibited between approximately April 1 and July 15. This restriction would serve to limit damage to the residual stand as logging activities would not be occurring during the period of maximum bark slippage. If the purchaser is able to demonstrate the ability to conduct the operation with minimal amounts of damage to the residual stand, this stipulation may be waived or modified.
  - 2.3.2.3.3 Retain, in approximate proportion to their existence in the stand, those trees with characteristics desirable to a range of wildlife species (hardwoods, trees with broken or forked tops, hollow cavities, large limbs).
  - 2.3.2.3.4 Where *P. weirii* is encountered within the thinning units, small “patch cuts” would remove all disease susceptible trees. Disease resistant species would be reserved. Patches would be the minimum size required (generally less than two acres) to ensure that the pathogen was isolated from the residual stand. No “patch cuts” would be placed within those portions of the Riparian Reserves being treated.
  - 2.3.2.3.5 Following completion of harvest, cut patches would be evaluated for planting with *P. weirii* resistant tree species. Where light levels are determined to be sufficient for survival and rapid growth, planting would be accomplished using western redcedar and red alder.

- 2.3.2.3.6 To be consistent with the *Dairy-McKay Watershed Analysis*, provide adequate shade to the stream, and protect the stream banks, channel and riparian zones which are adjacent to those portions of the Riparian Reserve being thinned, a “no-cut buffer” will be placed along all streams. These no-cut buffers will be at least 50 feet wide on both sides of all non-fish bearing streams and 100 feet wide on all fish bearing streams.
- 2.3.2.3.7 Ground-based equipment would not be permitted to enter those portions of the Riparian Reserves being treated except where they are able to stay on an existing or new roads or unless it is necessary to access the ground based yarding area in the southwest corner of unit 33-3.
- 2.3.2.3.8 Loaded logging trucks or rubber-tired loader needing to operate on the portion of the road accessing unit 33-3 which is over 20% grade shall utilize an auxiliary means to power assist, or be specifically designed and approved by the manufacturer for operation on grades in excess of 20 percent.
- 2.3.2.3.9 Where skyline corridors are constructed, the Purchaser would be required to leave a specified number of the reserve trees necessary to be cut for corridor construction on-site to augment current CWD levels. This number would be dependent upon the length of the yarding corridor. On yarding corridors 500 feet or less in slope distance length, two of the larger-sized leave trees, as determined by the authorized officer, which are cut to create the corridors would be left on-site in a well-distributed pattern along the length of the corridor. On yarding corridors greater than 500 feet in slope distance length, six of the larger-sized leave trees as determined by the authorized officer, which are cut to create the corridors would be left on-site in a well-distributed pattern along the length of the corridors.

### 2.3.3 Alternative 3 (Cable Yarding System)

Alternative 3 would implement a commercial thinning within two treatment units which would be accomplished by utilizing a cable logging system only (see Figure 3 - Map of units and logging systems for Alternative 3). It would include timber harvest on up to approximately 46 acres within the GFMA/Matrix land allocation, and an additional 16 acres of thinning within the Riparian Reserve land allocation. It would be expected to yield approximately 1.175 MMBF of timber (see table 3).

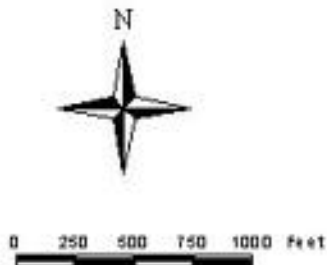
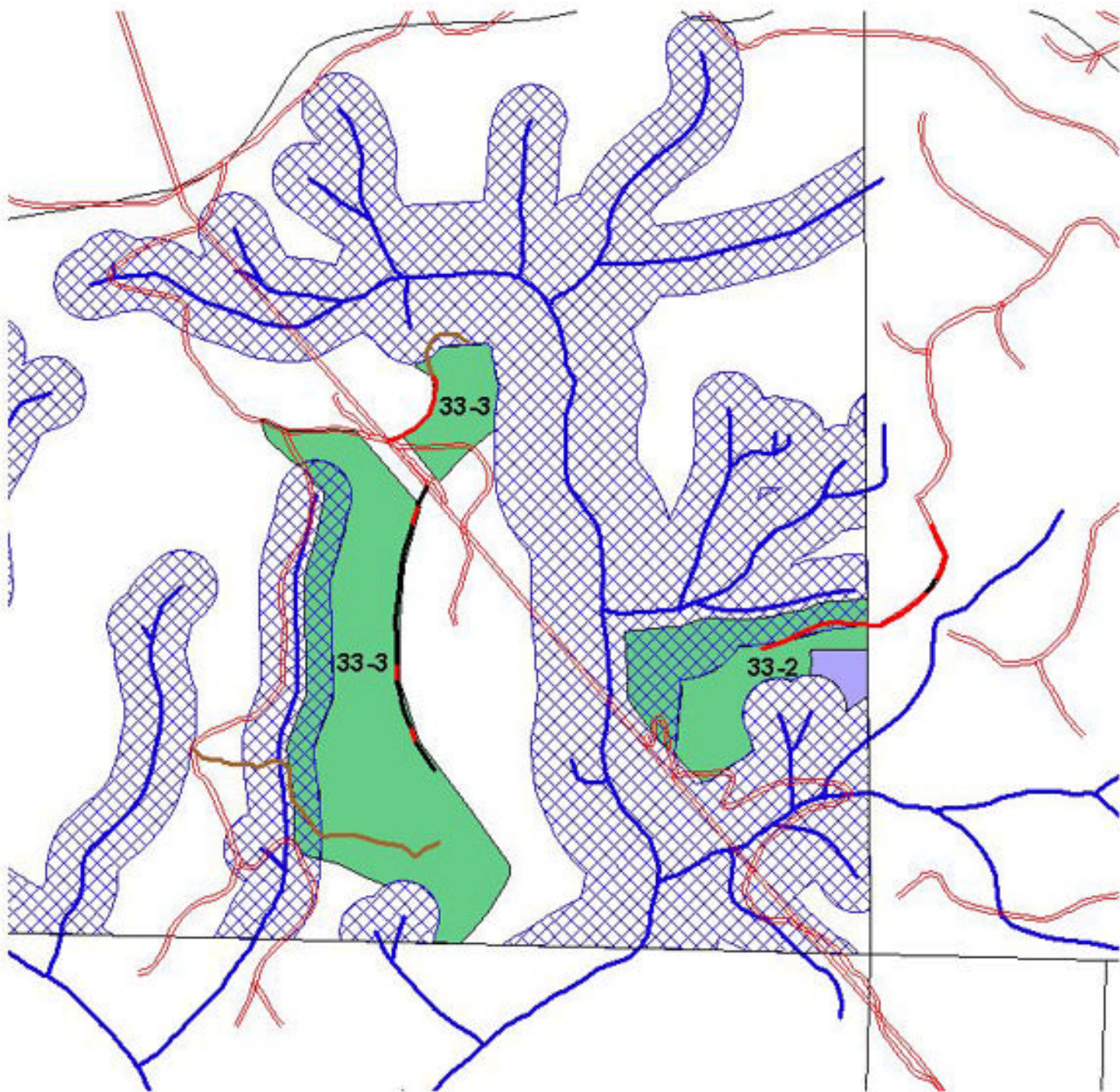
In short, this alternative differs from the proposed action by not treating unit 33-1; eliminating all ground based yarding; further minimize the impacts associated with the spur road constructed into unit 33-2 by requiring it to be constructed, utilized and decommissioned within a single operating season thereby making it a “**temporary road**” rather than a “semi-permanent road”; and by not rocking the road accessing unit 33-3 except on its steeper portions (see table 4). This natural surface road would not be sub-soiled based upon the natural rockiness of the substrate. In addition, based primarily upon the lack of rocked roads under this alternative, all operations (road construction, road reconstruction, hauling, road decommissioning) would occur during periods of low soil moisture (generally from June 15 through October 15).

*Note:* Because it was felt that the eastern portion of the regeneration harvest unit (unit 33-1) as contained within the proposed action could not be effectively logged with a cable yarding system due to the unit’s topography and the high occurrence of *P. weirii*, which precludes the presence of suitable lift trees, most of that portion of the unit proposed for ground based yarding was initially dropped from treatment. This resulted in less than 10 acres remaining within the regeneration unit which it was felt was not sufficient to warrant the road construction necessary to facilitate its treatment and thus the entire unit 33-1, as proposed within the proposed action, was dropped from this alternative. Similarly, the area proposed for treatment under alternative 3 within unit 33-3 is approximately 5 acres smaller than proposed action which is a result of the fact that cable yarding these areas would be difficult and/or potentially result in unacceptable impacts.

As in the proposed action, all felling and yarding activities within thinning units would be prohibited between approximately April 1 and July 15. This restriction would serve to limit damage to the residual stand as logging activities would not be occurring during the period of maximum bark slippage. If the purchaser is able to demonstrate the ability to conduct the operation with minimal amounts of damage to the residual stand, this stipulation may be waived or modified to start as early as the start of the period of low soil moisture allows, approximately June 15. Felling and yarding operations would cease at the end of the low soil moisture period approximately October 15.

As applicable, all other design features within Alternative 2 would also be included within Alternative 3.

Figure 3  
Powerline Dairy - Alternative 3



Legend

- Riparian Reserves
- Moist Habitat Area
- Logging Systems - Alt. 3
- Cable
- Road Activity
  - New Road Construction
  - Road Reconstruction
  - Road Obliteration



No warranty is made by the Bureau of Land Management for use of the data for purposes not intended by the Bureau of Land Management.

Table 3. Harvest Units Information. This table summarizes the harvest units information for Alternative 3. Stand information and harvest volumes are estimates based on preliminary unit examination.

HARVEST UNIT(s)	TOTAL ACRES	STAND BIRTH DATE	LOGGING METHOD	STAND TREATMENT	% BASAL AREA REMOVED	% TREES REMOVED	ESTIMATED HARVEST VOLUME (board feet)
<b>33-1</b>	<b>0</b>	<b>n/a</b>	<b>none</b>	<b>none, dropped from the proposal for treatment</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>33-2</b>	<b>16</b>	<b>1930</b>	<b>The entire unit, about 16 acres cable logged</b>	<b>Commercial thinning with emphasis on retention of the larger trees. Some small patch cuts in Matrix to control <i>P. weirii</i> infestations. The proposal includes thinning of about 8 acres of Riparian Reserve.</b>	<b>42</b>	<b>46</b>	<b>275,000</b>
<b>33-3</b>	<b>46</b>	<b>1930</b>	<b>The entire unit, about 46 acres cable logged</b>	<b>Commercial thinning with an emphasis on retention of the larger trees. The proposal includes thinning of approximately 8 acres of Riparian Reserve.</b>	<b>41</b>	<b>40</b>	<b>900,000</b>
<b>Totals</b>	<b>61</b>						<b>1,175,000</b>

<b>Table 4. The amount (linear feet) of new road construction, reconstruction of existing roads and road decommissioning which would result from implementing Alternative 3</b>					
<b>Proposed Action</b>	<b>New Construct.</b>	<b>Reconstruct.</b>	<b>Mitigation Measures</b>	<b>De-commission</b>	<b>Net</b>
<b><i>Unit 33-2</i></b>					
Reconstruct natural surface road* on private land to access unit; install a temporary culvert in swale.		180	Reconstruct, utilize, subsoil, waterbar, block road and remove culvert within same season.	-180	0
Construct new natural surface temporary road across ridge on private land.	660		Construct, utilize, subsoil, waterbar and block road within same season.	-660	0
Construct new natural surface road* across ridge on BLM; approximately 600 feet on ridgetop in Riparian Reserve.	660		Construct, utilize, subsoil, waterbar and block road within same season.	-660	0
<b><i>Unit 33-3</i></b>					
Construct new natural surface road* on bench on BLM in NE corner of unit.	500		Subsoil, waterbar and block road	-500	0
Reconstruct existing natural surface road on ridgetop on BLM; natural surface except on steeper sections where it will be rocked. Do not subsoil based on natural rockiness of substrate.		1,340	Block road; Stabilize and waterbar if needed	0	1,340
Construct, including rocking, new rock road on southern portion of ridge on BLM land.	360			0	360
Decommission “legacy” road on bench and ridgetop within NE corner of the unit.			Subsoil, waterbar and block road	-400	-400
Decommission “legacy” road on bench and ridgetop within southern portion of the unit; Remove the fill on log culvert on perennial stream.			Subsoil, waterbar and block road	-2,100	-2,100

TOTAL	2,180	1,520		-4,500	-800
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\* Semi-permanent roads that may be used for longer than one dry season but are decommissioned by the end on the contract.

#### 2.3.4 Alternative 4 (Helicopter Yarding System)

Alternative 4 proposes to implement a timber sale on approximately 89 acres using a helicopter yarding system. It combines both commercial thinning and regeneration harvest techniques and is expected to yield approximately 2.040 MMBF of timber (see table 5). Because of the potential safety hazards associated with utilizing an aerial yarding system near powerlines, the boundaries for units 33-2 and 33-3 within this alternative have been modified from that in the proposed action to include at least a 200 foot no-treatment buffer along the powerline. In addition, the south-eastern boundary of unit 33-3 was altered from that in the proposed action to include some additional treatment area which was excluded from the proposed action based upon access limitations associated with cable or ground-based logging systems.

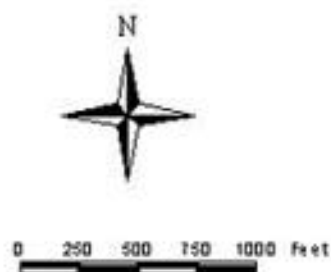
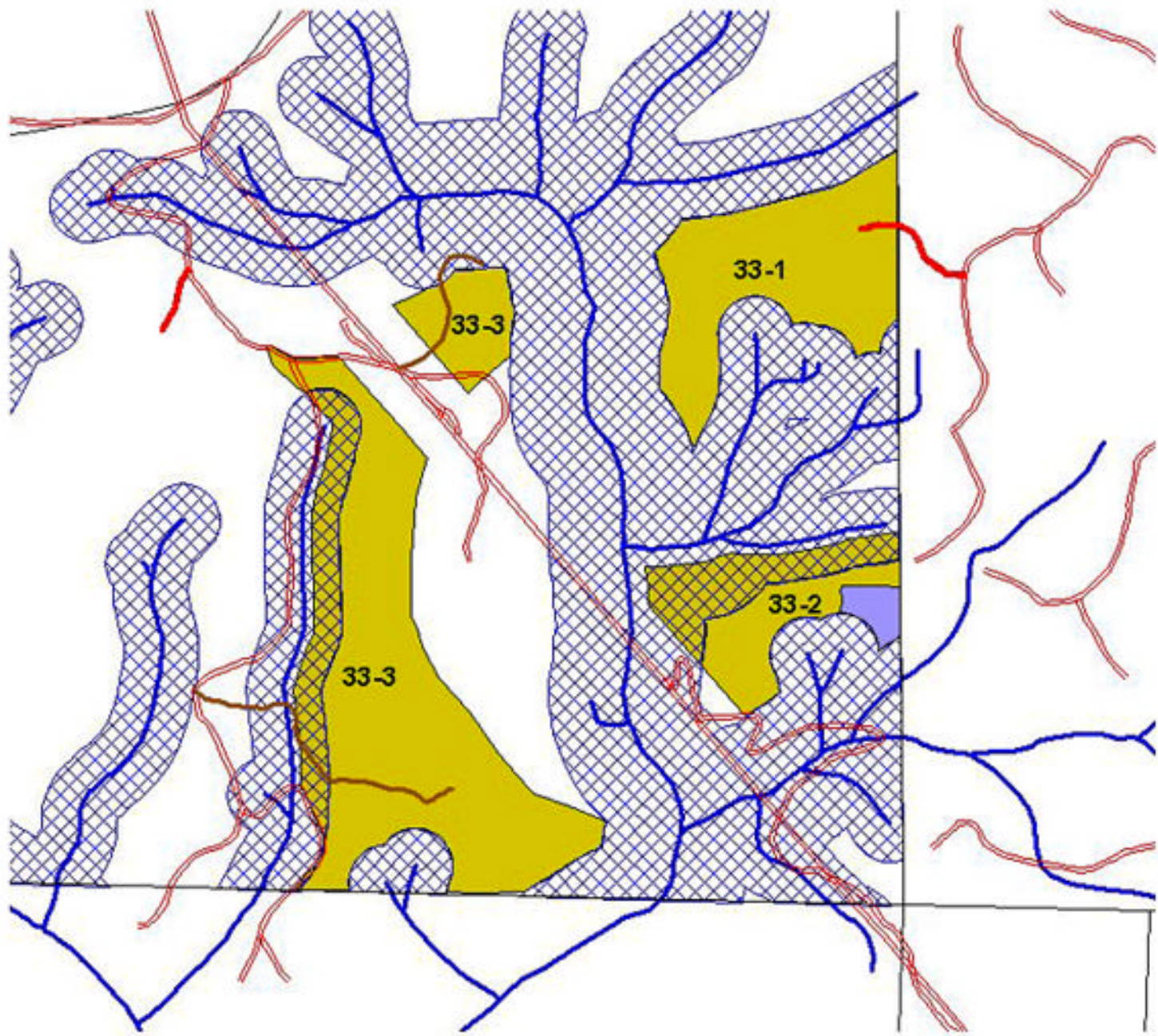
This alternative includes timber harvest on approximately 74 acres within the GFMA/Matrix land allocation, and an additional 15 acres of thinning within the Riparian Reserve land allocation. The units within this alternative are mapped on Figure 4 - Map of units and logging systems for Alternative 4. One unit of approximately 22 acres (unit 33-1) of *P. weirii* infested timber within the Matrix land allocation would be regeneration harvested and reforested with tolerant and non-susceptible species. In addition, a total of approximately 67 acres would be commercially thinned within two units (units 33-2 and 33-3). Approximately 52 acres of thinning would occur within the Matrix land allocation and 15 acres would occur within Riparian Reserves. Commercial thinning of these stands would increase their rate of growth, general vigor and windfirmness.

As in the proposed action, all felling and yarding activities within thinning units would be prohibited between approximately April 1 and July 15. This restriction would serve to limit damage to the residual stand as logging activities would not be occurring during the period of maximum bark slippage. If the purchaser is able to demonstrate the ability to conduct the operation with minimal amounts of damage to the residual stand, this stipulation may be waived or modified to start as early as the start of the period of low soil moisture allows, approximately June 15.

Two landings, each approximately 0.5 acres in size, would need to be constructed. To avoid overflights of the powerline with helicopters carrying external loads, one would be located on each side of the powerline. In addition, approximately 1,250 feet of natural surface spur road would need to be constructed to support the aerial logging operation (See Figure 4 and table 6). No landings or spur roads would be constructed within Riparian Reserves to prevent petroleum products or other pollutants from entering the watercourse. All landing and spur road construction as well as all timber harvest activities (felling, yarding, hauling) would occur during periods of low soil moisture (generally from June 15 through October 15). An exception would be felling and yarding within thinning areas due to bark slippage period as previously noted. Under this alternative the semi-permanent road to unit 33-2 would not be built as in the proposed action therefore, no culverts would need to be installed under this alternative. To avoid having to clear logging debris from the two legacy roads to be decommissioned, subsoiling of these roads would occur prior to timber felling. As applicable, all other design features within Alternative 2 would also be included within Alternative 4.



Figure 4  
Powerline Dairy - Alternative 4



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No warranty is made by the Bureau of Land Management for use of the data for purposes not intended by the Bureau of Land Management.

Table 5. Harvest Units Information. This table summarizes the harvest units information for Alternative 4. Stand information and harvest volumes are estimates based on preliminary unit examination.

HARVEST UNIT(s)	TOTAL ACRES	STAND BIRTH DATE	LOGGING METHOD	STAND TREATMENT	% BASAL AREA REMOVED	% TREES REMOVED	ESTIMATED HARVEST VOLUME (board feet)
33-1	22	1930	helicopter	Regeneration Harvest retaining up to approximately 20 trees/acre for wildlife trees, snag recruitment & CWD.	67	86	800,000
33-2	14	1930	helicopter	Commercial thinning with emphasis on retention of the larger trees. Some small patch cuts in Matrix to control <i>P. weirii</i> infestations. The proposal includes thinning of approximately 7 acres of Riparian Reserve.	42	46	240,000
33-3	53	1930	helicopter	Commercial thinning with an emphasis on retention of the larger trees. The proposal includes thinning of approximately 8 acres of Riparian Reserve.	41	40	1,000,000
Totals	89						2,040,000

<b>Table 6. The amount (linear feet) of new road construction, reconstruction of existing roads and road decommissioning which would result from implementing Alternative 4</b>					
<b>Proposed Action</b>	<b>New Construct.</b>	<b>Reconstruct.</b>	<b>Mitigation Measures</b>	<b>Decom-mission</b>	<b>Net</b>
<b><i>Unit 33-1</i></b>					
Construct new natural surface road* on bench top across private land to access the unit	700		Subsoil, waterbar and block road; replant Douglas fir	-700	0
Construct new natural surface road* and landing onto BLM	200		Subsoil, waterbar and block road	-200	0
<b><i>Unit 33-2</i></b>					
Utilize same landing and haul route as for the treatment of unit 33-1					0
<b><i>Unit 33-3</i></b>					
Construct new natural surface road* on bench on BLM land NW of the unit	350		Subsoil, waterbar and block road	-350	0
Decommission “legacy” road on bench and ridgetop within NE corner of the unit.			Subsoil, waterbar and block road	-900	-900
Decommission “legacy” road on bench and ridgetop within the southern portion of the unit; Remove the fill on log culvert on perennial stream.			Subsoil, waterbar and block road	-2100	-2100
<b>TOTAL</b>	<b>1,250</b>			<b>-4,250</b>	<b>-3,000</b>

\* Semi-permanent roads that may be used for longer than one dry season but are decommissioned by the end on the contract.

Table 7. Comparison of the Alternatives for Selected Parameters				
	No Action	Alternative 2 - The Proposed Action	Alternative 3	Alternative 4
Acres Treated (approximate)	no acres treated	unit 33-1: 22 acres Matrix unit 33-2: 8 acres Matrix, 8 acres RR unit 33-3: 42 acres Matrix, 8 acres RR  88 acres total (72 acres Matrix, 16 acres RR)	unit 33-1: 0 acres unit 33-2: 8 acres Matrix, 8 acres RR unit 33-3: 38 acres Matrix, 8 acres RR  61 acres total (46 acres Matrix, 16 acres RR)	unit 33-1: 22 acres Matrix unit 33-2: 7 acres Matrix, 7 acres RR unit 33-3: 45 acres Matrix, 8 acres RR  89 acres total (74 acres Matrix, 15 acres RR)
Logging system	no timber harvest	unit 33-1: 8 acres Cable, up to 14 acres Ground-based unit 33-2: 16 acres Cable unit 33-3: 30 acres Cable, up to 21 acres Ground-based	unit 33-1: Unit Not Treated unit 33-2: 16 acres Cable unit 33-3: 46 acres Cable	unit 33-1: 22 acres Helicopter unit 33-2: 14 acres Helicopter unit 33-3: 53 acres Helicopter
Estimated Harvest Volume	no volume generated	unit 33-1: 800 MBF unit 33-2: 275 MBF unit 33-3: 900 MBF  total: 1,975 MBF	unit 33-1: 0 unit 33-2: 275 MBF unit 33-3: 900 MBF  total: 1,175 MBF	unit 33-1: 800 MBF unit 33-2: 240 MBF unit 33-3: 1,000 MBF  total: 2,040 MBF
Roads: New Construction Re-construction Decommissioned	no road construction	New Construction      4,280 Re-construction      1,520 Decommissioned      - 6,600	New Construction      2,180 Re-construction      1,520 Decommissioned      - 4,500	New Construction      1,250 Re-construction      0 Decommissioned      - 4,250
Net Change		Net Change      - 800 feet	Net Change      - 800 feet	Net Change      - 3,000 feet
Seasonal restrictions	no restrictions	<i>Road Construction, reconstruction and decommissioning, Ground-based regeneration harvesting, and hauling on natural surfaced roads:</i> period of low soil moisture, generally June 15 to October 15. <i>Ground-based Thinning Operations</i> (felling, yarding): generally July 16 to October 15 although the restriction may be waived from June 15 to July 16. <i>Cable Thinning Operations</i> (felling, yarding): generally July 16 to March 31 although the restriction may be entirely waived. <i>Instream work:</i> June 1 to Sept. 30 (unless waived by ODFW) <i>Hauling on rocked and paved roads:</i> No restrictions.	<i>Hauling, Road Construction, reconstruction and decommissioning:</i> June 15 to October 15. <i>Thinning Operations</i> (felling, yarding): generally July 16 to October 15 although the restriction may be waived from June 15 to July 16. <i>Instream work:</i> June 1 to Sept. 30 (unless waived by ODFW)	<i>Hauling, Road Construction, road decommissioning</i> and felling and yarding within the regeneration unit: June 15 to October 15. <i>Thinning Operations</i> (felling, yarding): generally July 16 to October 15 although the restriction may be waived from June 15 to July 16. <i>Instream work:</i> June 1 to Sept. 30 (unless waived by ODFW)

## **3.0 AFFECTED ENVIRONMENT and ENVIRONMENTAL CONSEQUENCES**

### **3.1 Introduction**

This Chapter shows the present condition (i.e., affected environment) within the project area and the changes that can be expected from implementing the action alternatives or taking no action at this time. The “no action” alternative sets the environmental baseline for comparing effects of the action alternatives.

The Soil/Water major issue, as described in Chapter 1.6, defines the scope of environmental concern for this project. The environmental effects (changes from present baseline condition) that are described in this chapter reflect the identified major issue as well as three other elements of the environment (vegetation, wildlife, and fisheries). For those other resources or values which review is required by statute, regulation, Executive Order, or policy, Appendix 4 contains the appropriate documentation as to the effects of the proposed action on those resources or values.

Appendix 5 contains a description of past, present, and reasonably foreseeable future actions that will be considered in the cumulative effects discussion in this chapter.

For a full discussion of the physical, biological, and social resources of the Salem District, refer to the FEIS (Final Environmental Impact Statement), dated September, 1994, for the Salem District Resource Management Plan. The discussion in this EA is site-specific and supplements the discussion in the Salem District FEIS.

### **3.2 Soil and Water (Major Issue)**

#### **3.2.1 Affected Environment**

##### **3.2.1.1 Soil**

The soils within the project area are predominantly the Braun, Scaponia, and Tolany series. These soils formed on mountainous uplands, benches and sideslopes from colluvium (material moved downhill by gravity) derived mainly from marine tuffaceous sandstone and siltstone. They are moderately fine textured, moderate permeable, and well-drained soils. Table 8 summarizes locations, characteristics and management limitations of these soils.

<b>Table 8 - Soil Characteristics</b>						
<b>SOIL SERIES</b>	<b>UNITS LOCATED</b>	<b>SOIL DEPTH (IN)</b>	<b>SURFACE ROCK CONTENT</b>	<b>EROSION HAZARD</b>	<b>WIND-THROW HAZARD</b>	<b>COMPACTION HAZARD</b>
Braun silt loam	33-1	20-40	<15%	Very High	Moderate	Severe
Scaponia silt loam	33-2 & 33-3	40-60	<15%	Very High	Slight	Severe
Tolany loam	33-2 & 33-3	60+	<15%	High	Slight	Moderate

When wet or moist, unsurfaced roads are susceptible to erosion and rutting. Unsurfaced roads in this area are commonly impassable during sustained rainy periods. Forest roads require suitable surfacing for year-round use. Using standard wheeled or tracked equipment when the soil is moist can cause rutting, puddling (the destruction of soil aggregates), and compaction, especially with repeated passes with heavy equipment. Cable yarding systems impact the soil less and help to maintain soil productivity better than ground-based yarding. Increased soil compaction and puddling decreases infiltration and may result in increased surface runoff and erosion. Displacement of the surface layer occurs most readily when the soil is dry.

A field review of slope instability indicators identified very steep slopes along the northern and eastern margins of unit 33-3 and a small headwall in the south-central margin of unit 33-2. These areas (totaling approximately 14 acres excluding unstable lands within Riparian Reserves) in the potential timber sale preliminary assessment area were not included in the proposed timber harvest and road construction activities because of geologic conditions including steep slopes that may facilitate slope instability and possible mass failures. No active landslides were observed in the assessment area.

Soil productivity has been reduced in portions of the project area by past forest management practices. Forest productivity is strongly correlated with soil porosity, the amount of open space in the soil fraction. Logging (primarily ground-based yarding, skid trail development and road construction) can reduce the soil porosity through the compaction of the soil surface and upper subsurface. Older aerial photographs reveal marks of past land management of the area. These photos reveal that much of the past ground-based yarding in the project area occurred in harvest Unit 33-3. A reconnaissance level field investigation was conducted on Unit 33-3 to help characterize existing soil compaction conditions. Based on the investigation and additional field work, it is estimated that approximately 22% of the area capable of being ground based yarded and 13% of the proposed treatment areas are compacted. Some of the compacted areas with no surface displacement have had some recovery. The extent of recovery is unknown. Most of the observed compaction appears to be light to moderate and occurs mainly in the upper 8 inches of the soil surface.

For additional discussions of the current conditions of the soil resource within the 5<sup>th</sup> field Dairy McKay watershed refer to Appendix 5.

### **3.2.1.2 Water**

The proposed treatment area is located within the Upper East Fork Dairy Creek Watershed, a 6<sup>th</sup> field watershed within the northern portion of the Tualatin River Sub-basin, a subset of the Willamette Basin. East Fork Dairy Creek drains into Dairy Creek, a tributary to the Tualatin River. The watershed is underlain by marine sedimentary and tuffaceous rocks. The topography consists of ridges dividing incised valleys and hilly midslope benches. While the terrain is generally stable, landslides are common on very steep slopes and stream-adjacent slopes. The dominant mass movement process in the watershed is episodic debris slides and debris flows. Surface erosion on compacted and otherwise disturbed surfaces such as OHV trails and forest skid trails and roads are likely a major source of sediment, given the relatively high mapped road density, 4.0 linear miles per square mile, in the Upper East Fork Dairy Creek 6<sup>th</sup> field watershed. Analysis of aerial photography on another watershed within the resource area revealed that approximately an additional 40% of roads (legacy roads and new roads) are present but were not included on the GIS database. Assuming that the percentage of uncounted roads in this watershed are the same as the analyzed one, there are approximately 5.6 miles of road per square mile within the subwatershed.

The upper East Fork Dairy Creek, a low-to-mid order perennial stream, is located in a moderately steep, narrow valley channel. Seeps are fairly common on hillslopes. Stream channels are typically low sinuosity, high entrenchment, low width/depth ratio, and lack floodplain development. All streams in the vicinity of the proposed harvest units were identified, marked and surveyed for fish presence. A fishery habitat survey collected by BLM in 1994 on a nearby reach of the East Fork Dairy Creek found that the primary substrate is dominantly cobble, rubble, and bedrock and the secondary substrate is dominantly small gravel, cobble, and rubble. Unlike most of Dairy Creek, the stream channels in the vicinity of the proposed treatment areas appear to have an abundance of large legacy wood.

The project area is typical of the Coast Range in both climatic and hydrologic features. The climate is characterized by moderate temperatures, wet winters and cool, dry summers. Approximately 80% of the precipitation occurs between November and March. The principal driver of hydrologic processes in the watershed is precipitation in the form of rain. This is referred to as a rain dominated zone. The area may occasionally receive snow, but the quantity and duration of the snow does not normally produce rain-on-snow events. Snow interception and melt is not considered to be an important process in channel-altering peak flow events. Water yield is dominated by direct storm runoff as opposed to base flow. Due to the high infiltration capacity of the local soils, overland flow rarely occurs on undisturbed ground. Subsurface flow is the dominant storm runoff mechanism.

For additional discussions of the current conditions of the water resource within the 5<sup>th</sup> field Dairy McKay watershed refer to Appendix 5.

## **3.2.2 Environmental Consequences**

### **3.2.2.1 Soil**

Soil compaction and displacement on skid trails and roads will reduce water infiltration and hydraulic

conductivity, increase surface runoff and erosion, decrease soil organic matter and nutrient levels and create unhealthy conditions for beneficial soil organisms. Severe compaction has been linked to reduction in soil productivity through reduced root growth, timber height and volume. Roads reduce forest productivity by the lands they occupy. Effects of compaction, compaction mitigation (subsoiling), and *soil displacement* by skid trails and roads on soil productivity will be assessed.

### **3.2.2.1.1 Alternative 1 (No Action)**

Under this alternative there would be no change in the existing soil conditions as discussed in section 3.2.1.1. There would be no construction, decommissioning of legacy roads, or harvesting activity which would cause additional disturbance, compaction and displacement. Nor would there be a reduction in road densities. Compaction levels would continue to decrease and soil productivity would continue to improve until the next disturbance (e.g. logging, fire).

### **3.2.2.1.2 Alternative 2 (Proposed Action)**

#### **1. Direct and Indirect Effects**

##### **a) Ground-based yarding**

Use of designated skid trails on approximately 20 acres in Unit 33-3 (including the ground-based commercial thinning of about 2 acres of Riparian Reserve) would limit overall soil compaction to approximately 10% of the ground-based yarded surface area. Ground-based yarding would result in a net increase in soil compaction on about 1.4 acres. This assumes that 7% of the area harvested will have new soil compaction or displacement over existing levels.

Ripping skid trails and associated compacted areas (approximately 0.14 acres) within the regeneration harvest Unit 33-1 with properly designed equipment and proper technique would break up the compacted soil. This would occur on the 14 acres of regeneration harvest accomplished with a ground-based yarding system. Ripping would allow water and roots to penetrate the soil, thus restoring almost all of the potential long-term productivity. Use of winged subsoilers in areas would not be expected to reduce productivity by damage to adjacent roots. (USFS 1998). Skid trails in Unit 33-3 would not be subsoiled because treatment would be difficult and ineffective due to the large (wide) equipment required and the nature of the skid trails. Skid trails are usually about 12 to 14 feet wide and wind around reserve trees, stumps, and other obstacles.

##### **b) Cable yarding**

Cable yarding 54 acres in Units 33-1, 33-2, and 33-3 (~~including commercial thinning~~ of about 14 acres of Riparian Reserve) with partial suspension would result in overall compaction on about 3% of the cable yarded area resulting in a net increase in soil compaction on about 1.6 acres. All landings would be subsoiled upon completion of yarding and associated activities.

##### **c) Road Construction**

New construction of 3,920 feet of semi-permanent natural surface roads would result in an estimated increase of 1.6 acres in soil compaction and displacement. This includes two segments of road being constructed on ridgetops but within Riparian Reserves; up to 250 feet within unit 33-1 and 600 feet



within unit 33-2. Following harvest, the natural surface roads and landings would be decommissioned by decompacting (subsoiling). It is assumed that the proposed reconstruction of 180 feet of an existing road to access unit 33-2 would result in a small additional soil disturbance and a non-appreciable loss in timber productivity. Rocking 1,340 feet of reconstructed road and 360 feet of new road would remove approximately 0.7 acres of forest land.

In summary, timber harvesting on 88 acres and construction of 3,920 feet of new semi-permanent natural surface roads would result in about 4.6 acres of compaction over existing levels. This would include commercial thinning 14 acres by cable yarding and 2 acres by ground-base yarding in Riparian Reserves. Research by McNabb and Froehlich (1984) concluded that the loss in site productivity is approximately equal to one half of the area where soils become compacted. Based on that research, the estimated loss in soil productivity for timber after prescribed decompaction treatments would be an estimated 50% on 4.6 acres. Reduced productivity would be confined to small, localized areas.

If the Purchaser chooses to cable yard a portion of the proposed ground-based yarding areas, the overall compaction and displacement area would be reduced. Cable yarding 70 acres (the assumed maximum area that could be cable yarded), ground-based yarding 14 acres, and building 3,920 feet of natural surface roads would result in about 4.0 acres of compaction. This would include commercial thinning 16 acres by cable yarding and eliminating ground-based yarding within the Riparian Reserves. After subsoiling the 4,300 feet of skid trails, landings, and roads the loss in soil productivity would be an estimated 50% on 4.0 acres.

## **2. Short-term and Long-term Effects.**

Assessing soil productivity is difficult because of its variability and complexity. It varies over time and space across a landscape and is affected by a large number of interacting factors such as climate, soil properties, organic matter, nutrient cycling and management practices. Some researchers predict that high silvicultural intensity and frequent harvesting on sites that are inherently low productive and harsh conditions will eventually result in declines in long-term productivity.

The length of time in which the compacted soils in the project area will impede water and roots penetration is uncertain. Little research has been done in the Oregon Coast Range. The speed at which the soil will naturally recover depends on the severity of compaction, the climate, soil type, soil biota and amount organic matter. Recovery is a gradual process. Only a minimal amount of recovery would be expected to occur during the first few years after disturbance. Generally, long-term productivity is more resilient for the high productivity soils. These soils are productive mainly due to their favorable moisture and temperature conditions, high organic matter contents and andic properties. With the exception of some of the more disturbed roads and possibly a few small areas of shallow rocky soils on ridge tops, it is likely that these soils will recover to near pre-disturbance levels relatively quickly, probably a few decades or less. Approximately 1.0 acres of forest land would be permanently removed by rocking 1,700 feet of road.

## **3. Cumulative Effects**

An analyses of cumulative effects on soil resources addresses the effects of the proposed action along

with past, present and reasonably foreseeable future actions on soil productivity within the Upper East Fork Dairy Creek watershed (see appendix 5). Looking at the existing and anticipated road construction and ground-based and cable-based timber harvest gives a reasonable picture of the amount of soil disturbance in the watershed, which can then be related to the historic, undisturbed condition to give an overall view of soil productivity impacts in the watershed.

Disturbed soil areas were analyzed by identifying areas with Forestry zoning, with slope gradients less than 40% and roads in the GIS data sets for Upper East Fork Dairy Creek watershed. Approximately 4,900 acres of the 5,178 acres in the watershed were identified as having lands capable of being ground-based yarded. It is assumed that 25% of this area has been or will be disturbed by ground-based equipment. Using these assumptions, there are about 1,200 acres of soil disturbed by roads or timber harvest, which is approximately 23% of the watershed. This is considered to be a conservative estimate, as the area disturbed by tractor logging could be much higher than the 25% assumption, does not include soil disturbance from cable-based yarding, and the quantity of roads in the GIS database may be low as well.

The magnitude of any effect is generally proportional to the area that is treated. Considering the proposed decompaction treatments for new roads, landings and skid trails, the 4.6 acres affected by soil compaction/displacement and 1.0 acres removed in the soil base in Alternative 2 will have a minimal effect on overall soil productivity in the 5,180 acre watershed. While the site-specific direct effects of forest management practices can be large, the cumulative effects on soil productivity resulting from these actions of this alternative on the watershed would be localized and have a minimal effect on the watershed.

### **3.2.2.1.3 Alternative 3 (Cable yarding system)**

#### **1. Direct and Indirect Effects**

Cable-based harvesting 61 acres ~~(including commercial thinning~~ of about 16 acres of Riparian Reserve) in this alternative can be expected to result in compaction on about 1.8 acres. New construction of 1,820 feet of natural surface road would result in an estimated 0.8 acres of soil compaction and displacement. It is assumed the proposed reconstruction and improvement of existing roads would result in minimal additional soil disturbance and a non-appreciable loss in timber productivity. The landings and new constructed natural surface roads would be subsoiled and water-barred upon completion of yarding. It is assumed that the proposed reconstruction of 180 feet of an existing road to access unit 33-2 would result in a small additional soil disturbance and a non-appreciable loss in timber productivity. Rocking 1,340 feet of reconstructed road and 360 feet of new road would remove approximately 0.7 acres of forest land.

This Alternative would result in lower levels of compaction and erosion than the proposed action, Alternative 2. Due to the elimination of the Unit 33-1 access road, the amount of new construction and disturbance would be reduced by one half. Less subsoiling would be needed to regain infiltration and productivity from these compacted road surfaces. After the prescribed decompaction treatments are completed, the loss in soil productivity for this Alternative is an estimated 50% on 2.6 acres, almost half of compaction of Alternative 2.

## **2. Short-term and Long-term Effects**

As compared to Alternative 2 where up to 35 acres could be harvested with a ground-based yarding system, the natural recovery from compaction would probably occur sooner under alternative 3. Cable-based harvesting normally creates less compaction and less severity than by ground-based systems. Approximately 1.0 acres of forest land would be permanently removed by rocking 1,700 feet of road.

## **3. Cumulative Effects**

As compared to Alternative 2, the proposed action, cumulative effects to soil productivity on the watershed would be smaller and non-appreciable under this Alternative.

### **3.2.2.1.4 Alternative 4 (Helicopter yarding)**

#### **1. Direct and Indirect Effects**

Helicopter yarding 89 acres (~~including commercial thinning~~ of about 15 acres of Riparian Reserve) in Alternative 4 can be expected to result in up to a one percent increase in soil compaction. Compaction at these levels would be expected to result in a negligible loss in site productivity. About 1,500 feet of new semi-permanent surface road would be constructed and up to 1 acre for landing sites would be needed. The roads and landings would be subsoiled and water-barred upon completion of yarding.

Under this Alternative, 2,780 fewer feet of semi-permanent road would be needed to be subsoiled compared to Alternative 2. After treating the roads and landings, it is estimated that the soil productivity would be reduced by 50% on 1.6 acres, about one quarter of Alternative 2.

#### **2. Short-term and Long-term Effects**

~~As compared to Alternative 2 and Alternative 3,~~ the natural recovery from compaction on the yarded area would be relatively rapid due to the low intensity of the expected compaction. While the amount of compaction and displacement on roads and landings would be smaller, the recovery rates on these areas would be comparable to alternatives 2 and 3.

#### **3. Cumulative Effects**

As compared to Alternative 2 and Alternative 3, cumulative effects to soil productivity on the watershed would be smaller and not appreciable under this Alternative.

### **3.2.2.2 Water**

Water quality may be affected by many factors associated with timber harvest activities. Road construction affects hydrologic functions by intercepting water, concentrating flows, extending drainage networks and altering water, and sediment and organic debris routing. Timber harvest removes vegetation and disturbs soils which often leads to reduced transpiration and infiltration rates. This may lead to increased water run-off, soil erosion (including mass movement) and potentially increase

sediment and reduce long-term large wood recruitment delivery to stream channels. Nutrients such as nitrogen and phosphorous may be delivered to streams in sediment from surface runoff generated by road and timber harvest activities. Water quality parameters such as temperature, dissolved oxygen, pH, and bacteria are not expected to be impacted under any of the alternatives. Effects of erosion on sedimentation, nutrient levels, and magnitude and timing of stream flows in the watershed will be assessed.

#### **3.2.2.2.1 Alternative 1 (No action)**

No direct or indirect effects would result from implementing this alternative since harvesting and proposed road construction and reconstruction would not take place. Existing sediment delivery and stream flows would be maintained at the current condition.

One possible exception would be for the perennial stream with a log culvert west of Unit 33-3. Eventually the log culvert will likely fail unless replaced or removed, resulting in additional sediment into the stream, causing at least a short-term degradation of the water quality within the small perennial stream and Upper East Fork Dairy Creek.

#### **3.2.2.2.2 Alternative 2 (Proposed action)**

Four spur roads are planned to access three timber sale units. All road construction would meet the design features and management directives listed in Chapter 2 of this EA. Roads would be located on ridgetops and benches while unstable areas would be avoided.

Approximately 4,280 feet of existing roads would be reconstructed. Reconstructing existing roads would reduce some undesirable or negative effects of roads relative to new construction. Most of the roads proposed for reconstruction are uninventoried roads. Uninventoried roads, commonly called “legacy” or “ghost” roads, are unmaintained travel ways not currently contained within the GIS roads database. They are mainly old logging roads, largely un-engineered, that were never intended for permanent vehicle access. All of the uninventoried roads in this project are natural surfaced.

Up to 250 feet of the road accessing 33-1 and up to 600 feet of the road accessing 33-2 would be built within Riparian Reserves. Ridge construction was chosen in order to avoid side-hill construction that would be necessary to avoid building within the Riparian Reserves. Side-hill construction would result in greater soil disturbance and higher potential erosion and sedimentation. Timber harvest and yarding would be prohibited within 50 feet of all non-fish bearing streams and 100 feet of all fish bearing streams. To protect watershed conditions in the Riparian Reserve, trees would be cable yarded during periods of dry soil conditions. Little or no sediment from road building and yarding operations would be expected to reach streams due to the site’s topography and buffers on streams.

Approximately 6,600 feet of the roads would be subsoiled. All bare soil areas created by road construction or renovation activities would be stabilized to reduce erosion following construction and use. Upon completion of logging, all landings and approximately 4,300 feet of skid trails within the regeneration Unit (33-1) would be subsoiled and if necessary water-barred, and blocked. Approximately 3,200 feet of uninventoried roads would be decommissioned. The overall result would be

a 800-foot net decrease in road length in the watershed as a result of these actions.

There are no roads proposed for construction, reconstruction or decommissioning that would cross fish-bearing streams. The only stream structure (culvert) planned for the project crosses an intermittent channel located on private land on a road that would be built to access unit 33-2. The stream channel is likely to be dry throughout the harvest period for unit 33-2. The culvert would be removed reestablishing drainage and the disturbed soils seeded to help minimize erosion and sedimentation.

Surface erosion generated by road building and decommissioning would be expected to be low and of short duration (1 to 5 years). Disturbed areas normally revegetate within two or three years after disturbance. Most of the erosion and sedimentation would occur during high water flows in the first and second year after disturbance. Locating roads on ridges would minimize erosion and mass movement failure associated with road building, thus reducing the chances of road-related sediment inputs into streams. Very little overland flow is normally seen on these kinds of soils. Most of the sediment produced from timber harvesting would travel very short distances before being trapped by duff and woody materials. Non-channelized flow rarely transports more than 100 feet through undisturbed vegetation; more than 30 feet is uncommon except on the steepest slopes. It is unlikely that any sediment produced from yarding would enter streams due to the permeability of the local soils and buffers on streams.

Most of the forest-related phosphorus inputs to streams are believed to come from fertilization, slash burning, and extensive ground disturbance and sediment production on lands rich in phosphorus. The Oregon Department of Forestry conducted stream monitoring studies in 1990 and 1991 and found high levels of phosphorus in sedimentary rock in the East Fork Dairy Creek. Phosphorus loading is not expected from the project because no fertilization or broadcast burning of slash is planned and the amount of erosion and sedimentation is expected to be small and short termed. The duff layer and dense vegetation found in no-cut buffers would be expected to effectively filter mobilized soil particles.

Little effect on the hydrology of the drainages in the project area is anticipated following this project. The proposed units are within the rain dominated zone. Watersheds within rain dominated zones are considered to have low potential risk of peak flow enhancement. In addition, over 75% of the proposed area for harvest would be commercially thinned rather than regeneration harvested. Commercial thinning is not expected to alter the forest canopy to the extent that it would affect the amount of water supplied to the soil or as run-off. Increased tree growth would result in gradual canopy closure, and any changes in hydrologic processes as a result of timber harvesting would diminish over time.

Existing roads in the watershed may be modestly impacting the stream flows. The estimated road density in the Upper East Fork Dairy Creek watershed (including legacy roads and new roads not currently on the GIS database) is about 5.6 miles of road per square mile or about 3% of the subwatershed. One study based on several small watershed basins (39 to 750 acres) in the Oregon Coast Range found significant increases (~20%) in peak flows when roads occupied greater than 12% of the basin (Harr et al. 1975). Peak flows were found to be small, inconsistent, and statistically non-significant when they occupied less than 5% of the basin. In a recent study on two western Washington watersheds lying entirely within transient snow zones, roads begin to impact stream flow (~increase of 11%) at road densities from 2.4 to 3.0 miles/square mile (Bowling and Lettenmaier 1997). No notable

change in the hydrologic regime would be expected in Alternative 2 since the amount of existing roads would be reduced by 800 feet.

Based on this information, the short- and long-term effects resulting from this project are unlikely to measurably affect the timing and magnitude of stream flows. Any effects are likely to be within the natural range of variability of the watershed and be short-lived.

### **Cumulative Effects**

A cumulative effects analysis was done to determine the effects of known and anticipated activities on water quality in Upper East Fork Dairy Creek. The scale of the analysis is the Upper East Fork Dairy Creek 6<sup>th</sup> field watershed, which encompasses approximately 5,180 acres. Known and anticipated activities that would occur throughout the Dairy Creek 5<sup>th</sup> field watershed are listed in Appendix 5 - Past, Present, and Reasonably Foreseeable Future Actions. It is assumed that activities on private and other government lands would be done in compliance with applicable county, state, and federal laws and regulations, such as the Oregon Forest Practices Act and the Federal Clean Water Act.

About 23% of the watershed area is administered by the BLM, less than 1% is Oregon Department of Forestry lands, about 51% is own by large private industrial wood product companies, and the remaining 26% is owned by private individuals and smaller companies, some of whom are managing their lands for timber production. There are a few scattered residences in the lower portion of the watershed. The primary land use in the watershed is timber production, and has been for the better part of this century. Logging of these highly dissected lands has resulted in a vast access road network with the average density being about 4.0 miles of road (an estimated 5.6 miles if new roads and legacy roads are included) per square mile of land.

Past, proposed and future foreseeable forest management activities would continue to impact the watershed's water quality. An analysis of the cumulative effects of the proposed action and other known and expected actions in the Dairy Creek watershed indicate that most of the water quality indicators are at present not properly functioning or at risk. (See Appendix 6 - The Matrix of Pathways and Indicators, used for Section 7 consultation for listed or proposed-for-listing anadromous fish and refer to Appendix 7 for a discussion of the alternatives relative to the Aquatic Conservation Strategy Objectives.) The anticipated activities on private or publicly managed lands are expected to maintain the current condition of these physical and biological baseline indicators, with the exception of road density within the project area which would be restored toward a properly functioning condition. There would be no degradation of water quality indicators as a result of this action, therefore there will be no cumulative effects on water quality.

### **3.2.2.2.3 Alternative 3 (Cable yarding systems)**

This alternative could increase soil erosion and sediment delivery to streams as result of timber harvest activities. This could cause the turbidity and sediment levels to increase above existing conditions. Refer to Appendix 6, Matrix of Pathways and Indicators, for additional discussion of the environmental effects of this alternative.

Sediment delivery to drainages or East Fork Dairy Creek is expected to be low and of short duration (one to five years) due to the limited routing of sediment through the remaining vegetation and slash. In comparison to the Alternative 2, the effects would be smaller. Like Alternative 2, the overall result of this alternative would be 800-foot net decrease in road length in the watershed, however under this alternative there would be 2,800 fewer feet of road construction and no ground-base yarding, only cable yarding. There would not be any regeneration harvesting, only commercial thinning. A smaller harvest area (61 acres versus 88 acres under Alternative 2) and cable yarding would result in less ground disturbance. Unlike Alternative 2, all the ground disturbing activities would be restricted to periods of low soil moisture when soils are strong and more resistant to compaction and erosion. Unlike Alternative 2, all log hauling would occur during the dry season (June 15 through October 15), minimizing risks of sediment delivery.

For similar reasons as in Alternative 2, water yield from this project under this alternative are unlikely to measurably affect the timing and magnitude of stream flows. Any effects are likely to be within the natural range of variability of the watershed and be short-lived.

### **Cumulative Effects**

As compared to Alternative 2, the proposed action, the anticipated activities on private and government managed lands are expected to maintain the current condition of these physical and biological baseline indicators, with the exception of road density within the project area which would be restored toward a properly functioning condition. There would be no degradation of water quality indicators as a result of this action, therefore there will be no cumulative effects on water quality.

#### **3.2.2.2.4 Alternative 4 (Helicopter yarding)**

This alternative could increase soil erosion and sediment delivery to streams as result of timber harvest activities. This could cause the turbidity and sediment levels to increase above existing conditions. Refer to Appendix 6, Matrix of Pathways and Indicators, for additional discussion of the environmental effects of this alternative.

Sediment delivery to drainages or East Fork Dairy Creek is expected to be little, if any due to the small amount of ground disturbance and the limited routing of sediment through the remaining vegetation and slash. In comparison to the Proposed Alternative 2 and Alternative 3, the effects would be smaller. Under this alternative there would be 3,030 fewer feet of new road construction and no road reconstruction. The net result of this would be a decrease of 3,000 feet of road within the watershed while both other action alternatives resulted in a net decrease of 800 feet within the watershed. No roads would be built within a Riparian Reserve. There would be less soil disturbance by yarding with a helicopter compared to ground-base and cable yarding. Unlike Alternative 2 (but similar to Alternative 3), all the ground disturbing activities would be restricted to periods of low soil moisture when soils are strong and more resistant to compaction and erosion. Unlike Alternative 2 (but similar to Alternative 3), all log hauling would occur during the dry season (June 15 through October 15), minimizing risks of sediment delivery.

For similar reasons as in Alternative 2 and Alternative 3, water yield from this project under this alternative are unlikely to measurably affect the timing and magnitude of stream flows. Any effects are likely to be within the natural range of variability of the watershed and be short-lived.

### **Cumulative Effects**

As compared to Alternative 2, the proposed action, the anticipated activities on private and government managed lands are expected to maintain the current condition of these physical and biological baseline indicators, with the exception of road density within the project area which would be restored toward a properly functioning condition. There would be no degradation of water quality indicators as a result of this action. There would however be a long-term decrease in sedimentation and turbidity due to sub-soiling of roads and the removal of log culvert.

### **3.3 Vegetation**

#### **3.3.1 Special Status Species and Noxious Weeds**

##### **3.3.1.1 Affected Environment - Special Status Species and Noxious Weeds**

For information on the affected environment relative to Special Status Species and noxious weeds see Appendix 8 - Biological Evaluation for Special Status Plant Species/Survey & Manage and Noxious Weeds.

##### **3.3.1.2 Environmental Consequences - Special Status Species and Noxious Weeds**

For information on the environmental consequences relative to Special Status Species and noxious weeds see Appendix 8 - Biological Evaluation for Special Status Plant Species/Survey & Manage and Noxious Weeds, and/or Table 13 for a summary of environmental consequences.

### **3.3.2 Forests (Matrix and Riparian Reserve)**

#### **3.3.2.1 Affected Environment - Forests (Matrix and Riparian Reserve)**

An analysis was done of late-successional forest (LSF) stands on federal lands within the Dairy Creek watershed (see *15% Analysis Documentation in conjunction with the 3rd year Evaluation of the Salem District RMP* updated 11/15/99 - a copy is located at the Tillamook RA office). In that analysis, LSF was defined as those stands that are 80-years old or greater. The analysis showed that 6,135 acres of the federal lands are forested, and 301 of those acres (5%) meet the definition of LSF. This is well below the 15% level identified in the 15% Standard and Guide (S&G). Additional stands that do not currently meet the LSF definition but are in the next highest age class were also identified. These additional stands total 707 acres and are all in the 70-year age class and within modeled riparian reserves. When included with the LSF stands, the total for this watershed is 16%, which is above the 15% threshold. The 16 acres of Riparian Reserve stands which are proposed for treatment are included



in the additional stands identified to meet the 15% S&G.

For additional information on the affected environment relative to forest and riparian resources, see Appendix 2 - Silvicultural Prescription for the Project.

#### **3.3.2.2 Environmental Consequences - Forest (Matrix and Riparian Reserve)**

The proposed treatments will not impact any stands which have been identified as currently exhibiting LSF characteristics and being managed to meet the 15% S&G. The 16 acres of Riparian Reserve which are proposed for treatment have been identified as acres which, upon developing LSF habitat features, will be counted to meet the 15% S&G. The thinning which is proposed for these stands will have a beneficial impact on the amount of LSF in the watershed, in that it will promote the development of LSF characteristics in these stands, which will contribute to achieving the goals of the 15% S&G earlier than if these stands were left to develop on their own.

For information on the environmental consequences relative to forest resources, within both Matrix and Riparian Reserve land allocations, see Appendix 2 - Silvicultural Prescription for the Project, and/or Table 13 for a summary of environmental consequences.

### **3.4 Wildlife**

#### **3.4.1 Affected Environment - Wildlife**

For information on the affected environment relative to wildlife resources see Appendix 3 - Biological Evaluation for Wildlife Resources.

#### **3.4.2 Environmental Consequences - Wildlife**

For information on the environmental consequences relative to wildlife resources see Appendix 3 - Biological Evaluation for Wildlife Resources, and/or Table 13 for a summary of environmental consequences.

### **3.5 Fisheries**

#### **3.5.1 Affected Environment - Fisheries**

The Powerline Dairy project area is within the East Fork of Dairy Creek drainage which feeds into the Upper Willamette River via the Tualatin River. The Dairy Creek drainage is a 5<sup>th</sup> field watershed draining 231 square miles in the northern part of the Tualatin River Basin. The watershed contains the mainstem of Dairy Creek and three mainstem tributaries, the east and west forks of Dairy Creek and

McKay Creek. The proposed treatment area is located within the Upper East Fork Dairy Creek 6<sup>th</sup> field watershed. Approximately 4% of the land in the Dairy Creek 5<sup>th</sup> field watershed is in federal ownership. Potential routes for transporting timber from the project area may enter the Scappoose Creek 5<sup>th</sup> field watershed and/or the Upper Nehalem River 5<sup>th</sup> field watershed.

Fish species found within the Dairy Creek watershed are listed in Table 9. Coho salmon are not native to the Dairy Creek watershed, but were introduced in the 1920's and now reproduce naturally within the watershed. In March of 1999, the upper Willamette ESU (evolutionarily significant unit) of steelhead, which includes the steelhead within the Dairy Creek watershed, was federally listed as threatened under the ESA (Endangered Species Act). Dairy Creek also falls within the Upper Willamette chinook salmon (*O. tshawytscha*) ESU area also listed as threatened, however, chinook are not known to inhabit this watershed, currently or historically. Critical habitat for both steelhead and chinook has been designated with an effective date of March 17, 2000, and includes the Dairy Creek watershed. Cutthroat trout, sculpin and western brook lamprey were collected during presence/absence surveys conducted in 1999 on the streams within the Powerline Dairy project area, (Section 33 of T. 4 N., R. 3 W.). Steelhead were not found within the project area. Although data on steelhead distribution in the Dairy Creek watershed is limited, the best estimate is that steelhead are located approximately 0.5 miles downstream of the project area. Coho salmon are expected to be found at least 0.5 miles or more downstream of the project area.

The major beneficial uses of water in Dairy Creek include domestic and municipal consumption, cold water fisheries, recreation, irrigation, manufacturing, livestock watering and wildlife. An estimated 69 miles of stream in the Dairy Creek watershed are on the ODEQ (Oregon Department of Environmental Quality) water quality limited list. Water quality problems include excessive *E. coli* counts, high water temperature, low dissolved oxygen and low pH. All the listed stream segments are located downstream of the Upper East Fork Dairy Creek 6<sup>th</sup> field watershed.

The three salmonids present in this watershed differ somewhat in their habitat, but all require cool water, structurally diverse channels and clean spawning gravel for maintenance of healthy populations. Less is known about the requirements of the non-salmonid species, however the same general habitat features are expected to benefit them as well. Large wood pieces play a vital role in maintaining channel complexity by creating scour to form pools, recruiting and maintaining spawning gravel, and providing cover. The *Dairy-Mckay Watershed Analysis*, (Washington Co. SWCD and BLM 1999), identified increased sedimentation and decreased large woody debris inputs as the major factors affecting salmonid habitat within the Dairy Creek watershed. Salmonid habitat, especially in the mainstems, is generally limited in the Tualatin Plain, and used mainly as migration corridors. The Tualatin Mountain portions of the drainage provide some quality salmonid habitat, however much of the habitat has been diminished due to past land management actions. Streams within or adjacent to the project area generally have a good supply of large wood.

Possible timber haul routes may enter the Upper Nehalem drainage and/or the Scappoose Creek drainage. Fish species found within the Upper Nehalem are listed in Table 10. Fish species found within the Scappoose Creek drainage are listed in Table 11. Critical habitat for all the federally listed species in Tables 10 and 11 has been designated with an effective date of March 17, 2000, and includes the Dairy Creek watershed. Habitat requirements of the fish species found within these drainages are the same as described above for the species within the Dairy Creek watershed. Likewise, a general

lack of large wood and excessive sedimentation are the main aquatic habitat deficiencies identified in the *Scappoose Creek Watershed Analysis* (BLM 1996a), and the *East Fork Nehalem Watershed Analysis* (BLM 1996).

Table 9. Fish Species and Status within the Dairy Creek Watershed

Common Name	Scientific Name	Status
Upper Willamette steelhead trout	<i>Oncorhynchus mykiss</i>	federally listed - threatened
Upper Willamette chinook salmon	<i>Oncorhynchus tshawytscha</i>	federally listed - threatened
cutthroat trout	<i>Oncorhynchus clarki</i>	
coho salmon	<i>Oncorhynchus kisutch</i>	introduced
Pacific lamprey	<i>Lampetra tridentatus</i>	Bureau tracking
river lamprey*	<i>Lampetra ayresi</i>	Bureau tracking
western brook lamprey	<i>Lampetra richardsoni</i>	
redside shiner	<i>Richardsonius balteatus</i>	
reticulate sculpin	<i>Cottus perplexus</i>	
torrent sculpin	<i>Cottus rhotheus</i>	

\*presence not verified

Table 10. Fish Species and Status within the Scappoose Creek Watershed

Common Name	Scientific Name	Status
Lower Columbia steelhead trout	<i>Oncorhynchus mykiss</i>	federally listed - threatened
Lower Columbia chinook salmon	<i>Oncorhynchus tshawytscha</i>	federally listed - threatened
Columbia River chum salmon	<i>Oncorhynchus keta</i>	federally listed - threatened
SW Washington/Columbia River cutthroat trout	<i>Oncorhynchus clarki</i>	federally proposed
SW Washington/Columbia River coho salmon	<i>Oncorhynchus kisutch</i>	federal candidate state listed - threatened
Pacific lamprey	<i>Lampetra tridentatus</i>	Bureau tracking
river lamprey*	<i>Lampetra ayresi</i>	Bureau tracking
western brook lamprey	<i>Lampetra richardsoni</i>	
sculpin	<i>Cottus sp.</i>	

\*presence not verified

Table 11. Fish Species and Status within the Upper Nehalem River Watershed		
Common Name	Scientific Name	Status
Oregon Coast coho salmon	<i>Oncorhynchus kisutch</i>	federal listed - threatened
Oregon Coast steelhead trout	<i>Oncorhynchus mykiss</i>	federal candidate
Oregon Coast cutthroat trout	<i>Oncorhynchus clarki</i>	federal candidate
Oregon Coast chinook salmon	<i>Oncorhynchus tshawytscha</i>	
Pacific Coast chum salmon	<i>Oncorhynchus keta</i>	Bureau sensitive
Pacific lamprey	<i>Lampetra tridentatus</i>	Bureau tracking
western brook lamprey	<i>Lampetra richardsoni</i>	
river lamprey*	<i>Lampetra ayresi</i>	Bureau tracking
sculpin	<i>Cottus</i> sp.	

\*presence not verified

Refer to Appendix 6, Matrix of Pathways and Indicators, for additional discussion of the environmental baseline conditions.

### 3.5.2 Environmental Consequences - Fisheries

#### Alternative 1 (No Action)

Refer to Appendix 6, Matrix of Pathways and Indicators, for additional discussion of the environmental effects of this alternative, including any interrelated or interdependent actions, on relevant indicators. Refer to Appendix 7 for a discussion of the alternatives relative to the Aquatic Conservation Strategy Objectives.

No action would occur under Alternative 1, therefore no direct effects would occur to fish or fish habitat. The log culvert will eventually fail, resulting in additional sediment into the stream and possible adverse impacts to fish and fish habitat. As this is a "no action" alternative, no ESA call would be made.

Cumulative Effects (Dairy Creek Watershed): The *Dairy-McKay Watershed Analysis*, (Washington Co. SWCD and BLM 1999), identified increased sedimentation and decreased large woody debris inputs as the major factors affecting salmonid habitat within the Dairy Creek watershed. Salmonid habitat, especially in the mainstems, is generally limited in the Tualatin Plain, and used mainly as migration corridors. The Tualatin Mountain portions of the drainage provide some quality salmonid habitat, however much of the habitat has been diminished due to past land management actions. An estimated 69 miles of stream in the Dairy Creek watershed are on the ODEQ (Oregon Department of Environmental Quality) water quality limited list. Water quality problems include excessive *E. coli* counts, high water temperature, low dissolved oxygen and low pH. Numbers of Upper Willamette

steelhead spawners have had a steep and continuing decline since 1988. The decline has been attributed mainly to destruction and modification of habitat, overutilization for recreational purposes, and natural and human-made factors (Federal Register: March 10, 1998, Vol. 63, No. 46, Proposed Rules, pp. 11797-11809). Though cutthroat trout are described as relatively abundant, it is likely that they are experiencing a downward trend for the same reasons as steelhead. Trends for other fish species within the watershed are mostly unknown, but are suspected to be downward given the habitat limitations described above.

If the “no action” alternative was selected, potential adverse impacts from timber harvest activities would be avoided. The beneficial effects of reducing road mileage within the watershed and removing a log culvert would also not occur. Eventually the log culvert would fail, adding sediment to the stream and potentially adversely impacting fish downstream. Road mileage would remain the same or increase within the watershed due to road building on non-BLM lands, which may result in negative impacts to fish from increased sedimentation. However, the overall adverse and beneficial impact at the watershed scale resulting from taking no action at this time is minimal and would not alter the long-term viability of fish species in the Dairy Creek watershed or affect trends in fish populations.

### **Alternative 2 (Mixed Cable/Ground-Based Yarding)**

Refer to Appendix 6, Matrix of Pathways and Indicators, for additional discussion of the environmental effects of this alternative, including any interrelated or interdependent actions, on relevant indicators. Refer to Appendix 7 for a discussion of the alternatives relative to the Aquatic Conservation Strategy Objectives.

This alternative could result in sediment delivery to streams as a result of road building and decommissioning, yarding of logs and transporting logs, which could lead to indirect effects to fish and fish habitat. A portion of the timber harvest activities in unit 33-3 are expected to take place during the winter, when the potential of sediment moving into streams is most likely to occur. Potential impacts to aquatic habitat include turbidity and sediment above existing conditions and decreased pool quality due to excess sediment input. Impacts to fish may involve loss of reproductive success, loss of individuals from the population, and loss of habitat elements.

The project includes the following actions which would minimize or eliminate sediment movement into streams: decommissioning of roads for a 800 foot net decrease in road mileage, decompaction of landings, rocking roads used during the wet season to avoid sediment run-off, a small percentage of Riparian Reserves treated (approximately 16 acres), no-cut buffers along perennial and intermittent streams, no ground-based yarding equipment or skid trails allowed within Riparian Reserves (with the exception of the use of winch cable, and where logging equipment is able to be operated from an existing road [ie. SW corner of unit 33-3]), utilize existing skid trails to the greatest extent possible, limiting the number and width of new skid trails and cable yarding corridors, and restrict ground-based yarding to periods of low soil moisture (generally from June 15 through October 15). Log hauling and road building/decommissioning activities may result in short term increases in turbidity, but there should not be long term changes in stream sediment levels.

The potential for sediment entering streams within either the Scappoose Creek Watershed or the Upper

Nehalem River Watershed due to winter (wet season) hauling is negligible. There is a slight possibility of sediment entering streams during winter transport of logs because several potential haul routes would entail travel by log trucks on approximately 5 miles of unpaved road before reaching pavement. The haul routes would be mainly on ridgetops and any streams crossed would likely be small, intermittent, headwater streams. The probability of sediment entering any streams and increasing sediment or turbidity levels above winter background levels is very low.

The ESA call for listed upper Willamette Steelhead trout, if Alternative 2 was implemented, would be "*May Affect, Likely to Adversely Affect*" and "*May Affect, Likely to Adversely Affect*" designated critical habitat for upper Willamette Steelhead trout and upper Willamette chinook salmon, due to potential of sediment entering streams during the various ground disturbing activities and hauling of logs described above. The design features incorporated into the project make adverse impacts to upper Willamette steelhead, and other fish species found within the Dairy Creek drainage a low probability, and would not result in a trend toward federal listing of any non-listed species or lead to any loss of population viability.

The ESA call for Lower Columbia River steelhead trout, SW Washington/Lower Columbia River coastal cutthroat trout, Oregon Coast coho salmon, Oregon Coast steelhead trout, and Oregon Coast coastal cutthroat trout, if Alternative 2 was implemented, would be "*May Affect, Not Likely to Adversely Affect*", and "*May Affect, Not Likely to Adversely Affect*" designated critical habitat for Lower Columbia River steelhead trout, Lower Columbia River chinook salmon, Columbia River chum salmon due to negligible chance of sediment entering streams during winter hauling of logs. Lower Columbia River chinook salmon, Columbia River chum salmon and SW Washington/Lower Columbia River coho salmon are found within drainages potentially entered during timber hauling, however they are located well downstream of any impacts from sediment, thus the ESA call for these species, if Alternative 2 was implemented, would be "*No Effect*". Adverse impacts to other fish species within the Scappoose Creek watershed or the Upper Nehalem River watershed are a very low probability.

See Table 12 for a summary of effect calls for federally listed, proposed and candidate fish species and designated critical habitat.

Cumulative Effects (Dairy Creek Watershed): The trends for fish species in the Dairy Creek 5<sup>th</sup> field watershed are the same as described under Alternative 1. Future management actions on BLM land will be in accordance with the Salem RMP which contains management direction to maintain or restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems, and to maintain or enhance fisheries potential. Since only about 4% of the watershed is owned by the BLM, any action taken on federal land will have minimal beneficial or adverse impacts on fish species and their habitats within the watershed. The BLM will likely pursue cooperative efforts with the Tualatin Watershed Council, private landowners and others to implement instream habitat improvements, which would lead to some improvement in aquatic habitat conditions throughout the watershed. In addition, the *Oregon Plan for Salmon and Watersheds* should lead to some improvement in aquatic habitat, though to what extent is unknown as this is a largely volunteer effort. If Alternative 2 were implemented there would be potential short term adverse impacts from timber harvest activities and also long-term beneficial effects from a small reduction in road mileage and removal of a log culvert that will eventually fail. The area to be harvested is only 0.06% (88 acres) of the Dairy Creek 5<sup>th</sup> field watershed with only 22.4

acres to be regeneration harvested, and the probability of this project contributing to cumulative effects on fish species is unlikely. Neither the potential adverse impacts or the beneficial effects are anticipated to alter the long-term viability of fish species at the watershed scale in the Dairy Creek watershed.

Cumulative Effects (Scappoose Creek Watershed and Upper Nehalem River Watershed): The potential for sediment entering streams within either the Scappoose Creek Watershed or the Upper Nehalem River Watershed due to winter (wet season) hauling is negligible. No cumulative effects are expected.

### **Alternative 3 (Cable Yarding Only)**

Refer to Appendix 6, Matrix of Pathways and Indicators, for additional discussion of the environmental effects of this alternative, including any interrelated or interdependent actions, on relevant indicators. Refer to Appendix 7 for a discussion of the alternatives relative to the Aquatic Conservation Strategy Objectives.

This alternative could result in sediment delivery to streams as a result of road building and decommissioning, yarding of logs and transporting logs, which could lead to indirect effects to fish and fish habitat. Potential impacts to aquatic habitat include turbidity and sediment above existing conditions and decreased pool quality due to excess sediment input. Impacts to fisheries resources may involve loss of reproductive success, loss of individuals from the population, and loss of habitat elements.

Alternative 3 includes the following actions which would minimize or eliminate sediment movement into streams and should preclude adverse direct impacts to fish or fish habitat: decommissioning of roads for a 800 foot net decrease in road mileage, decompaction of landings, all activities restricted to periods of low soil moisture (generally from June 15 through October 15), a small percentage of Riparian Reserves treated (approximately 16 acres), and no-cut buffers along perennial and intermittent streams.

Alternative 3 differs from Alternative 2 in that no timber harvest activities would take place during the winter, no ground-based yarding would occur, there would be no regeneration harvest, the amount of new road construction is approximately half of what is required in Alternative 2, and the road accessing unit 33-2 which would be built in Riparian Reserves would be constructed, used and decommissioned in one season, therefore the potential for sediment entering streams is lower than in Alternative 2. Log hauling and road building/decommissioning activities may result in short term increases in turbidity, but there should not be long term changes in stream sediment levels.

Since hauling would not occur during the wet season the potential for sediment entering streams within either the Scappoose Creek Watershed or the Upper Nehalem River Watershed is considered extremely unlikely and adverse impact to fishes within either watershed are not anticipated.

The ESA call for listed upper Willamette Steelhead trout, if Alternative 3 was implemented would be "*May Affect, Likely to Adversely Affect*" and "*May Affect, Likely to Adversely Affect*" designated critical habitat for upper Willamette Steelhead trout due to potential of sediment entering the stream during the various ground disturbing activities and hauling of logs described above.

The ESA call for Lower Columbia River steelhead trout, SW Washington/Columbia River coastal



cutthroat trout, and Oregon Coast coho salmon, and designated critical habitat as applicable, would be "No Effect", because hauling of logs would only occur during the dry period of the year. Lower Columbia River chinook salmon, Columbia River chum salmon and SW Washington/Lower Columbia River coho salmon are found within drainages potentially entered during timber hauling, however they are located well downstream of any impacts from sediment and hauling of logs would only occur during the dry period of the year, thus the ESA call for these species and their designated critical habitat would be "No Effect".

The design features incorporated into the project make adverse impacts to upper Willamette steelhead and the other fish species found within the Dairy Creek drainage a low probability.

See Table 12 for a summary of effect calls for federally listed, proposed and candidate fish species and designated critical habitat.

Cumulative Effects (Dairy Creek Watershed): The trends for fish species in the Dairy Creek 5<sup>th</sup> field watershed are the same as described under the Alternative 1. Future management actions on BLM land will be in accordance with the Salem RMP which contains management direction to maintain or restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems, and to maintain or enhance fisheries potential. Since only 4% of the watershed is owned by the BLM, any action taken on federal land will have minimal beneficial or adverse impacts on fish species and their habitats within the watershed. The BLM will likely pursue cooperative efforts with the Tualatin Watershed Council, private landowners and others to implement in-stream habitat improvements, which would lead to some improvement in aquatic habitat conditions throughout the watershed. In addition, the *Oregon Plan for Salmon and Watersheds* should lead to some improvement in aquatic habitat, though to what extent is unknown as this is a largely volunteer effort. If Alternative 3 were implemented there would be potential short term adverse impacts from timber harvest activities and also long-term beneficial effects from a small reduction in road mileage and removal of a log culvert that will eventually fail. The area to be harvested is only 0.04% (61 acres) of the Dairy Creek 5<sup>th</sup> field watershed with no regeneration harvest, and the probability of this project contributing to cumulative effects on fish species is unlikely. Neither the potential adverse impacts or the beneficial effects are anticipated to alter the long-term viability of fish species at the watershed scale in the Dairy Creek watershed.

Cumulative Effects (Scappoose Creek Watershed and Upper Nehalem River Watershed): Since no activities, including hauling, would take place during the winter (wet season) no adverse impacts are expected, therefore no cumulative effects would occur.

#### **Alternative 4 (Helicopter Yarding)**

Refer to Appendix 6, Matrix of Pathways and Indicators, for additional discussion of the environmental effects of this alternative, including any interrelated or interdependent actions, on relevant indicators. Refer to Appendix 7 for a discussion of the alternatives relative to the Aquatic Conservation Strategy Objectives.

This alternative could result in sediment delivery to streams as a result of road building and

decommissioning, yarding of logs and transporting logs, which could lead to indirect effects to fish and fish habitat. Potential impacts to aquatic habitat include turbidity and sediment above existing conditions and decreased pool quality due to excess sediment input. Impacts to fisheries resources may involve loss of reproductive success, loss of individuals from the population, and loss of habitat elements.

Alternative 4 includes the following actions which would minimize or eliminate sediment movement into streams and should preclude adverse direct impacts to fish or fish habitat: decommissioning of roads for a 3,000 foot net decrease in road mileage, decompaction of landings, all activities restricted to periods of low soil moisture (generally from June 15 through October 15), a small percentage of *Riparian Reserves* treated (approximately 16 acres), and no-cut buffers along perennial and intermittent streams.

Alternative 4 differs from Alternative 2 in that no timber harvest activities would take place during the winter, a helicopter yarding system would be used, the amount of new road construction is approximately 30% of what is required in Alternative 2, no road reconstruction, and no roads would be built in *Riparian Reserves*, therefore the potential for sediment entering streams is lower than in Alternative 2. Use of helicopter yarding, less new road construction and no road reconstruction is also expected to result in less potential for sediment entering streams than in Alternative 3. Log hauling and road building/decommissioning activities may result in short term increases in turbidity, but there should not be long term changes in stream sediment levels.

Since hauling would not occur during the wet season the potential for sediment entering streams within either the Scappoose Creek Watershed or the Upper Nehalem River Watershed is considered extremely unlikely and adverse impact to fishes within either watershed are not anticipated.

The ESA call for listed upper Willamette Steelhead trout, if Alternative 4 was implemented would be "*May Affect, Not Likely to Adversely Affect*" and "*May Affect, Not Likely to Adversely Affect*" designated critical habitat for upper Willamette Steelhead trout due to negligible potential of sediment entering the stream during the various ground disturbing activities and hauling of logs described above.

The ESA call for Lower Columbia River steelhead trout, SW Washington/Columbia River coastal cutthroat trout, and Oregon Coast coho salmon, and designated critical habitat as applicable, would be "*No Effect*", because hauling of logs would only occur during the dry period of the year. Lower Columbia River chinook salmon and Columbia River chum salmon are both found within drainages potentially entered during timber hauling, however they are located well downstream of any impacts from sediment and hauling of logs would only occur during the dry period of the year, thus the ESA call for these species and their designated critical habitat would be "*No Effect*".

The design features incorporated into the project make adverse impacts to upper Willamette steelhead and the other fish species found within the Dairy Creek drainage a low probability, and no adverse impacts to fish species within the Scappoose Creek watershed and the Upper Nehalem River watershed.

See Table 12 for a summary of effect calls for federally listed, proposed and candidate fish species and designated critical habitat.

Cumulative Effects (Dairy Creek Watershed): The trends for fish species in the Dairy Creek 5<sup>th</sup> field watershed are the same as described under the Alternative 1. Future management actions on BLM land will be in accordance with the Salem RMP which contains management direction to maintain or restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems, and to maintain or enhance fisheries potential. Since only about 4% of the watershed is owned by the BLM, any action taken on federal land will have minimal beneficial or adverse impacts on fish species and their habitats within the watershed. The BLM will likely pursue cooperative efforts with the Tualatin Watershed Council, private landowners and others to implement instream habitat improvements, which would lead to some improvement in aquatic habitat conditions throughout the watershed. In addition, the *Oregon Plan for Salmon and Watersheds* should lead to some improvement in aquatic habitat, though to what extent is unknown as this is a largely volunteer effort. If Alternative 4 were implemented there would be a negligible potential for short term adverse impacts from timber harvest activities and also long-term beneficial effects from a small reduction in road mileage and removal of a log culvert that will eventually fail. The area to be harvested is only 0.06% (89 acres) of the Dairy Creek 5<sup>th</sup> field watershed with only 22.4 acres of regeneration harvest, little new road construction and helicopter yarding of logs. The probability of this project contributing to cumulative effects on fish species is highly unlikely. Neither the potential adverse impacts or the beneficial effects are anticipated to alter the long-term viability of fish species at the watershed scale in the Dairy Creek watershed.

Cumulative Effects (Scappoose Creek Watershed and Upper Nehalem River Watershed): Since no activities, including hauling, would take place during the winter (wet season) no adverse impacts are expected, therefore no cumulative effects would occur.

Table 12: Summary of Endangered Species Act Effect Calls for Listed, Proposed and Candidate Fish Species and Designated Critical Habitat.

	ESA Call By Alternative					
	Species			Critical Habitat		
Fish Species	Alt 2	Alt 3	Alt 4	Alt 2	Alt 3	Alt 4
Upper Willamette Steelhead	LAA	LAA	NLAA	LAA	LAA	NLAA
Upper Willamette Chinook	NE	NE	NE	LAA	LAA	NLAA
Lower Columbia Steelhead	NLAA	NE	NE	NLAA	NE	NE
Lower Columbia Chinook	NLAA	NE	NE	NLAA	NE	NE
Columbia River Chum	NE	NE	NE	NLAA	NE	NE
SW Washington/Lower Columbia Cutthroat	NLAA	NE	NE	N/A	N/A	N/A
SW Washington/Lower Columbia Coho	NE	NE	NE	N/A	N/A	N/A
Oregon Coast Coho	NLAA	NE	NE	NLAA	NE	NE
Oregon Coast Steelhead	NLAA	NE	NE	N/A	N/A	N/A
Oregon Coast Cutthroat	NLAA	NE	NE	N/A	N/A	N/A

LAA = May Affect, Likely to Adversely Affect

NLAA = May Affect, Not Likely to Adversely Affect

NE = No Effect

3.6                      **Summary of Environmental Consequences**

Table 13. Summary of the Environmental Consequences				
	Alternative 1 - No Action	Alternative 2 - The Proposed Action	Alternative 3	Alternative 4
Acres Treated (approximate)	No acres treated	Approximately 88 acres (72 acres Matrix, 16 acres RR)	Approximately 61 acres (46 acres Matrix, 16 acres RR)	Approximately 89 acres (74 acres Matrix, 15 acres RR)
Logging system	No timber harvest	Cable and ground-based	Cable	Helicopter
Expected volume	No volume generated	Approximately 2,010 MBF	Approximately 1,146 MBF	Approximately 2,049 MBF
New compaction <u>after</u> decompaction mitigation	No additional acres	unit 33-1 ground: 0.0 acres      cable: 0.2 acres unit 33-2 ground: 0.0 acres      cable: 0.6 acres unit 33-3 ground: 1.4 acres      cable: 0.9 acres roads: 1.6 acres Total: 4.6 acres	unit 33-1 cable: 0.0 acres unit 33-2 cable: 0.6 acres unit 33-3 cable: 1.3 acres roads : 0.8 acres Total: 2.7acres	spur roads and landings 1.6 acres    Total: 1.6 acres
Roads: New Construction Re-construction Decommissioned  Net Change	No New Road Construction, Decommissioning or Road Reconstruction	New Road Construction              4,280 Road Re-construction                1,520 Roads Decommissioned            - 6,600  Net Change                                - 800 feet	New Road Construction              2,180 Road Re-construction                1,520 Roads Decommissioned            - 4,500  Net Change                                - 800 feet	New Road Construction              1,250 Road Re-construction                0 Roads Decommissioned            - 4,250  Net Change                                - 3,000 feet
Effects on Water Quality	Current levels of erosion and sediment continue at current levels with possible exception of short-term impacts resulting from a log culvert failing	Short-term increase in erosion rates. Disturbance of 8,300 feet of road (building and decommissioning). Some ground disturbing activities and hauling likely to occur during periods of high soil moisture. Small, short-term increases in sedimentation and turbidity. Increases confined mainly to project area. Little increase anticipated downstream in fish bearing streams due to limited routing paths. Removal of log culvert reducing a possibility of major road failure.	Compared to Alt. 2, smaller, short-term increases in sedimentation and turbidity. Disturbance of 6,200 feet of road (building and decommissioning). Impacts confined mainly to project area, upstream of fish bearing streams. Ground disturbing activities and hauling restricted to low soil moisture periods. Removal of log culvert reducing a possibility of major road failure.	Compared to Alts. 2 & 3, smallest, short-term increases in sedimentation and turbidity. Disturbance of 4,250 feet of road (building and decommissioning). Ground disturbing activities and hauling restricted to low soil moisture periods. Removal of log culvert reducing a possibility of major road failure.
Effects on Soil Productivity	Approximately 13% of proposed treatment areas are compacted at some level. Soils continue too gradually and naturally rebound from current compaction levels until next severe disturbance.	4.6 acres of additional compaction (5% of treatment areas or 0.09% of subwatershed). Loss of long-term productivity is approximately 2.3 acres.	2.6 acres of additional compaction (3% of treatment areas or 0.05% of subwatershed) Loss of long-term productivity is approximately 1.3 acres.	1.6 acres of additional compaction (2% of treatment areas or 0.03% of subwatershed) Loss of long-term productivity is approximately 0.8 acres.

Effects on Hydrology	Gradual natural hydrologic recovery from past disturbances. Road density within project area would remain the same.	Existing roads (including legacy roads) reduced by 800 feet. Proposed actions unlikely to measurably affect stream flows. Any negative effects are likely to be within the natural range of variability of the watershed and be short-lived.	Existing roads (including legacy roads) reduced by 800 feet. Proposed actions unlikely to measurably affect stream flows. Negative effects, if any, would be smaller than Alt. 2	Existing roads (including legacy roads) reduced by 3,000 feet. Proposed actions unlikely to measurably affect stream flows. Negative effects, if any, would be smaller than Alt. 2 and Alt. 3.
Effects on Special Status Plant Species	No Effect - The beneficial nor adverse impacts associated with the action alternatives would not occur at this time. The alternative would not result in a trend toward federal listing or any loss in population viability.	Minimal Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.	Minimal Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.	Minimal Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.
Effects on Noxious Weeds	No Effect - Weed populations would not be expected to be impacted under this alternative.	Minimal Effect - This alternative would likely result in an increase in the number and possibly diversity of weed species in the project area. Roadsides are major establishment points and population centers for weeds and more feet of road would be created, reconstructed, and used in alternative 2 than in any other alternative. In addition, the higher usage of roads in this alternative would increase the likelihood of transporting weed parts to new locations. The regeneration harvest would also provide habitat for the establishment of weeds. In time, these species will again return to their low level as the native vegetation returns.	Minimal Effect - This alternative would have similar yet smaller scale effects than Alternative 2. Fewer feet of road would be constructed, fewer acres harvested and the regeneration harvest would not occur. All of these would decrease the opportunity for weed establishment by not providing new habitat. In time, these species will again return to their low level as the native vegetation returns.	Minimal Effect -The potential for weed spread in this alternative is less than in alternatives 2 and 3. The regeneration harvest would still provide a large amount of suitable habitat. However, almost 25% percent less roads would be constructed and no road would be reconstructed. In time, these species will again return to their low level as the native vegetation returns.

Effects on Forest Vegetation	<p>The beneficial nor adverse impacts associated with the action alternatives would not occur at this time.</p> <p>Unit 33-1 (Matrix) In the absence of treatment, tree mortality within the stand would continue as a result of <i>P.weirii</i> which would also continue spread into surrounding stands.</p> <p>Units 33-2 and 33-3 (Riparian Reserve and Matrix): Without treatment, the relative density of the stands would continue to increase. The growth rate of the trees would be expected to continue to slow down, diameter to height ratios would continue to decline and root system instability would increase. The decline in stem and root stability resulting from decreased crown size would further contribute to mortality from stem buckling and windthrow. The general lack of shrubs and understory within portions of the units including the riparian reserves, would be maintained as light levels continue to decrease.</p>	<p>A total of 88 acres are treated (72 acres Matrix, 16 acres RR). Within the Matrix, regeneration harvest would occur on 22 acres and thinning would occur on 66 acres, density management would occur within treated Riparian Reserve acres.</p> <p>Unit 33-1 (Matrix) Regeneration harvest would allow the removal of root diseased trees, reduction of susceptible tree species on the site and reforestation of the site with non-susceptible tree species. This would help to restore this portion of the Matrix/GFMA land allocation to a more productive condition by reducing the presence of <i>P.weirii</i> on the site through time as well as help prevent the fungus from moving into adjacent stands.</p> <p>Unit 33-2 and 33-3 (Riparian Reserve and Matrix): Following treatment an increase in residual tree crown development, and diameter and root system growth would be expected. The general health and vigor of understory trees and shrubs would be expected to increase as light levels increase following thinning.</p>	<p>A total of 61 acres are treated (46 acres Matrix, 16 acres RR). Unit 33-1 is not treated. Within the Matrix, all harvest activities would utilize commercial thinning techniques, density management would occur within treated Riparian Reserve acres.</p> <p>Unit 33-1 (Matrix) In the absence of treatment, tree mortality within the stand would continue as a result of <i>P.weirii</i> which would also continue spread into surrounding stands.</p> <p>Unit 33-2 and 33-3 (Riparian Reserve and Matrix): Same as alternative 2 with the exception that 4 acres fewer within the Matrix are treated.</p>	<p>A total of 89 acres are treated (74 acres Matrix, 15 acres RR). Within the Matrix, regeneration harvest would occur on 22 acres and thinning would occur on 66 acres, density management would occur within treated Riparian Reserve acres.</p> <p>Each unit would develop similar to that described for Alternative 2.</p>
Effects on T&E Wildlife Species	<p>No Effect</p> <p>The beneficial nor adverse impacts associated with the action alternatives would not occur at this time.</p>	<p>Minimal Effect</p> <p><i>May Effect but not likely to adversely affect</i> the spotted owl due to the modification and removal of dispersal habitat.</p>	<p>Minimal Effect</p> <p><i>May Effect but not likely to adversely affect</i> the spotted owl due to the modification of dispersal habitat.</p>	<p>Minimal Effect</p> <p><i>May Effect but not likely to adversely affect</i> the spotted owl due to the modification and removal of dispersal habitat.</p>
Effects on Other Special Status Wildlife Species	<p>No Effect</p> <p>The beneficial nor adverse impacts associated with the action alternatives would not occur at this time. The alternative would not result in a trend toward federal listing or any loss in population viability.</p>	<p>Minimal Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.</p>	<p>Minimal Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.</p>	<p>Minimal Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.</p>

Effects on other Wildlife Species	No Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.	Minimal Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.	Minimal Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.	Minimal Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.
Effects on T&E Fish Species and Designated Critical Habitat	<p>No Effect</p> <p>No action would occur under Alternative 1, therefore no direct effects would occur to fish or fish habitat. The beneficial nor adverse impacts associated with the action alternatives would not occur at this time.</p> <p>The log culvert would eventually fail, resulting in sediment be deposited into the stream and possible adverse impacts to fish and fish habitat.</p>	<p>Minimal Effect</p> <p><i>"May Affect, Likely to Adversely Affect"</i> the upper Willamette Steelhead trout and designated critical habitat, and upper Willamette chinook salmon designated critical habitat.</p> <p><i>"May Affect, Not Likely to Adversely Affect"</i>, Lower Columbia River steelhead trout and designated critical habitat, SW Washington/Lower Columbia River coastal cutthroat trout, Oregon Coast coho salmon and designated critical habitat, Oregon Coast steelhead trout, Oregon Coast coastal cutthroat trout, Lower Columbia River chinook salmon designated critical habitat, and Columbia River chum salmon designated critical habitat.</p> <p><i>"No Effect"</i> Lower Columbia River chinook salmon, Columbia River chum salmon and SW Washington/Lower Columbia River coho salmon.</p> <p>This alternative could result in sediment delivery to streams as a result of road building and decommissioning, yarding of logs and transporting logs, which could lead to indirect effects to fish and fish habitat. A portion of the timber harvest activities in unit 33-3 are expected to take place during the winter, when the potential of sediment moving into streams is most likely to occur. Potential impacts to aquatic habitat include turbidity and sediment above existing conditions and decreased pool quality due to excess sediment input. Impacts to fish may involve loss of reproductive success, loss of individuals from the population, and loss of habitat elements.</p>	<p>Minimal Effect</p> <p><i>"May Affect, Likely to Adversely Affect"</i> the upper Willamette Steelhead and designated critical habitat, and upper Willamette chinook salmon designated critical habitat.</p> <p><i>"No Effect"</i> Lower Columbia River steelhead trout, SW Washington/Lower Columbia River coastal cutthroat trout, Oregon Coast coho salmon, Oregon Coast steelhead trout, Oregon Coast coastal cutthroat trout, Lower Columbia River chinook salmon, Columbia River chum salmon and SW Washington/Lower Columbia River coho salmon.</p> <p>The potential impacts to fish are the same as in Alternative 2, however the potential for sediment entering streams is lower than in Alternative 2 due to no timber harvest activities during the winter, no ground-based yarding, no regeneration harvest, the amount of new road construction is approximately half of what is required in Alternative 2, and the road accessing unit 33-2 which would be built in Riparian Reserves would be constructed, used and decommissioned in one season.</p>	<p>Minimal Effect</p> <p><i>"May Affect, Not Likely to Adversely Affect"</i> the upper Willamette Steelhead and designated critical habitat, and upper Willamette chinook salmon designated critical habitat.</p> <p><i>"No Effect"</i> Lower Columbia River steelhead trout, SW Washington/Lower Columbia River coastal cutthroat trout, Oregon Coast coho salmon, Oregon Coast steelhead trout, Oregon Coast coastal cutthroat trout, Lower Columbia River chinook salmon, Columbia River chum salmon and SW Washington/Lower Columbia River coho salmon.</p> <p>The potential impacts to fish are similar to those associated with Alternative 2, however the potential for sediment entering streams is lower than in Alternative 2 and Alternative 3 due to no timber harvest activities during the winter, no ground-based yarding, the amount of new road construction is approximately 30% what is required in Alternative 2, no roads would be constructed in Riparian Reserves, and no road reconstruction would occur.</p>
Effects on Other Special Status Fish Species	No Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.	Minimal Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.	Minimal Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.	Minimal Effect - This alternative would not result in a trend toward federal listing or any loss in population viability.
Consistency with ACS objectives	Does not retard attainment of ACS objectives 1-3 and 6-9. Does not prevent the attainment of ACS objectives 1 - 9.	Does not retard or prevent attainment of ACS objectives 1-9.	Same as alternative 2	Same as alternative 2



### 3.7

### Conformance With Land Use Plans, Policies, and Programs

Alternative 1 (no action), Alternative 2 (the proposed action), Alternative 3 (cable yarding system only), and Alternative 4 (helicopter yarding system), unless otherwise noted, are in conformance with the following documents which provide the legal framework, standards, and guidelines for management of BLM lands in the Tillamook Resource Area:

- \* *Salem District Record of Decision and Resource Management Plan, May 1995*, pages 5-6 (ACS Objectives), 9-11 (Riparian Reserves), 20-22 (Matrix), 22 (Air Quality), 22-24 (Water and Soil), 24-27 (Wildlife Habitat), 28-32 (Special Status Species and Habitat), 36 - 37 (Visual Resources), 41-45 (Recreation), 46-48 (Timber Resources Objectives), 49-50 (Special Forest Products), 62-64 (Roads), 64-67 (Noxious Weeds and Fire/Fuels Management), and Appendix C1-C8 (Best Management Practices).
- ACS Objectives and Riparian Reserves Objectives: All of the action alternatives are predicted to result in the maintenance and/or restoration of ACS objectives (Appendix 7). Alternative 1 (No Action) could at some point in the future retard the attainment of two ACS objectives due to the fact that it does not result in the removal of the log culvert which is at risk of failure (see section 3.2.1). All of the alternatives would be expected to meet the Riparian Reserve objective to “provide habitat for special status, SEIS special attention and other terrestrial species.” The action alternatives, which thin approximately 16 acres of Riparian Reserve, would result in a more diverse, wider array of habitat types within the Riparian Reserves as the treated portions respond to the thinning with increased windfirmness, growth and vigor. Design features of the action alternatives would help minimize the risk of adverse impacts to populations of concern.
- Matrix Objectives: Alternatives 2, 3 and 4 contribute toward meeting the objective to “produce a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability.” This is accomplished through timber volume being offered for sale; firewood being offered to the public if slash accumulations at landings warrant; management of forest stands to reduce root rot infestations and produce over time, forests which have desired species composition, structural characteristics and distribution of seral or age classes. Alternative 1 (No Action) would not be meeting this objective because it would not contribute towards a "sustainable supply of timber" (timber volume would not be offered for sale at this time, firewood would not be offered, and active management would not occur in the root rot infected stands nor overstocked conifer stands, thus, tree survival and growth which would lead to a "sustainable supply of timber" would not be promoted).

Provide Connectivity between Late-successional Reserves. Project design features assure the project is consistent with this general objective. These design features include but are not limited to providing snag, green tree and down wood habitat features within the regeneration unit, as well as providing no-cut buffers along streams, and thinning stands in both Riparian Reserve and Matrix land allocations to promote tree growth,

crown development and increase the treated stand's general health and vigor.

Provide habitat for a variety of organisms associated with both late-successional and younger forests. Project design features assure the project is consistent with this general objective. These design features include but are not limited to providing snag, green tree and down wood habitat features within the regeneration unit, as well as thinning stands in both Riparian Reserve and Matrix land allocations to promote tree growth, crown development and increase the treated stand's general health and vigor.

All of the alternatives are consistent with the Matrix objective to "provide for important ecological functions . . . and maintenance of ecologically valuable structural components such as down logs, snags, and large trees". The action alternatives meet these objectives through project design features to retain green trees, snags and existing down woody debris. The no action alternative is believed to be consistent with this objective through more passive management; the existing structural components would be retained and additional components would be added as natural processes continue to occur at approximately the current rate.

Provide early successional habitat. With younger structural stages dominating the forested landscape within the watershed (Appendix 5 - Past, Present, and Reasonably Foreseeable Future Actions), this Matrix Objective is not considered applicable to the project.

- Air Quality Objectives: Any prescribed burning or burning of slash at roads and landings would adhere to smoke management/air quality standards.
- Water and Soils Objectives: Applicable Best Management Practices as described in the RMP, (Appendix C1-C10) are incorporated into the project design for the action alternatives and assure the maintenance of water quality and reduce the impacts to soil productivity while meeting other resource management objectives.
- Wildlife Habitat Objectives: Project design features of the action alternatives assure consistency with wildlife habitat objectives. These design features include but are not limited to providing snag, green tree and down wood habitat features within the regeneration unit, as well as requirements to protect existing CWD, reserving all merchantable-sized hardwoods non-merchantable sized cedar.
- Special Status and SEIS Special Attention Species and Habitat Objectives:

All of the alternatives are predicted not to contribute to the need to list or elevate their status to a higher level of concern (Chapter 3.2.2 and Appendix 2 and 8).

- Visual Resources Objectives: All of the alternatives are consistent with the visual resources management objectives.

- Timber Resources Objectives: All of the action alternatives are predicted to result in the attainment of applicable Timber Resource Objectives based upon the fact that they would help contribute toward a sustainable supply of timber through implementing a prescription which would promote tree survival and growth. Timber stands would be managed to reduce the risk of loss to fire, animal, insects disease. Alternative 1 (No Action) would not be meeting these objectives because it would not contribute towards a "sustainable supply of timber" (timber volume would not be offered for sale at this time, firewood would not be offered, and active management would not occur in the root rot infected stands nor overstocked conifer stands, thus, tree survival and growth which would lead to a "sustainable supply of timber" would not be promoted).
- Special Forest Products Objectives: All of the action alternatives are predicted to result in the attainment of applicable Special Forest Products Objectives based upon the fact that they would result in firewood being offered for sale to public if sufficient quantities are located on or near roads and landings. Alternative 1 (No Action) would not be meeting these objectives because it would not contribute toward the production and sale of special forest products.
- Noxious Weeds: All of the alternatives are predicted to avoid the introduction and spread of noxious weeds however they would likely result in an increase in the number and possibly diversity of weed species in the project area with these species returning to their low level as the native vegetation returns (see Appendix 8).

Alternatives 2, 3 and 4 contain design features to avoid the introduction and spread of noxious weeds (Chapter 2.3).

- Fire/Fuels Management: Alternatives 2, 3 and 4 contain fuel management activities that would be conducted in such a manner as to adhere to smoke management/air quality standards (Appendix 2) and meet ACS objectives.
  - Best Management Practices: Alternatives 2, 3 and 4 contain applicable Best Management Practices described in Appendix C1-C8 of the RMP.
- \* *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (April, 1994).*
- The RMP is consistent with the Record of Decision (*Salem District Resource Management Plan/Final Environmental Impact Statement, September, 1994, Chapter 4-96*). Since all of the action alternatives are consistent with the RMP, these alternatives are believed to be consistent with the Record of Decision.
- \* *Dairy-McKay Creek Watershed Analysis: The Dairy-McKay Watershed Analysis* (Washington County Soil and Water Conservation District and USDI Bureau of Land Management, 1999), supports the proposed activities. Recommendations contained on pages 109 - 116 of the WA were considered in the development the Powerline Dairy action alternatives.

Some of these recommendations are listed below.

Activities within the Riparian Reserve land allocation. Recommendations for terrestrial species and habitat include: “Maximize the current and future benefits derived from RR . . . for cavity dwellers and other species dependent upon late seral stage habitat features. Evaluate LSR stands under 80 years old and RR acres and consider the application of silvicultural prescriptions to benefit the development of late-seral stage habitat. Potentially beneficial treatments include thinning to encourage rapid growth and enhance development of late seral stage habitat . . .” and “When implementing silvicultural prescriptions in Riparian Reserves, consider use of logging systems and site preparation methods that would reduce site disturbance, and maintain a no-cut buffer appropriate to site specific conditions along stream channels.” (p. 110-111). Recommendations for forest resources issues include: “Consider thinning well-stocked and overstocked mid-aged conifer stands in RR to accelerate size development and promote windfirmness in remaining conifers. Variable-density thinnings Riparian Reserves . . .” (p. 110).

Activities within the Matrix land allocation Recommendations for forest resources issues include: “General priorities for selecting stands for regeneration harvest in Matrix allocations - Pure Douglas-fir stands where more than 25 percent of the area is in *P. weirii* disease centers . . .” (p. 113), also “General criteria for selecting stands for commercial thinning in the GFMA - top priority for commercial thinning should go to Douglas-fir stands that are 30 to 60 years old which have the following characteristics: Curtis Relative Density levels in the general range of 55 to 70; live-crowns on residual trees of 30 percent or more; less than 20 percent in *P. weirii* root rot centers.” (p. 113).

Road Construction and Decommissioning Recommendations for Erosion issues include the following: “Where appropriate, reduce existing soil compaction levels by obliterating roads that are not needed for future management and by treating old compacted areas such as dirt roads and cat trails with a winged subsoiled.” As well as “Identify road-related sediment problems, such as . . . failing water crossing structures . . . Evaluate the potential for sediment delivery from these sources to determine whether it is appropriate to fix the problem” (p. 109). Recommendations for water quality issues include the following: “Where feasible, avoid road-building activities within Riparian Reserves. Where these activities are necessary, use practices that minimize hazards to the aquatic system” (p. 109). Recommendations under sediment and Erosion (Preventative Measures) include “Incorporate considerations related to slope, soils, habitat objectives, and hydrologic function into the decision-making process when placing roads near Riparian Reserves” (p. 116). Recommendations for forest resources include: “Carefully evaluate the trade-off between relieving soil compaction and root damage to residual trees before recommending subsoiling in commercial thinned stands.” (p.113)

- \* *Coastal Zone Management Act*, as amended: The project area is **not** located within Oregon’s Coastal Zone boundary. However, the proposed action appears to be consistent with the applicable statewide planning goals identified in the Oregon Coastal Management Program.
- \* *Oregon Forest Practices Act*: All of the alternatives are consistent with the Oregon Forest Practices Act. Various project design features within the alternatives assure this compliance;

some of these features include but are not limited to the maintenance of Riparian Reserves, and a regeneration harvest unit which is less than 120 acres in size, contains an adequate number of wildlife trees, with plans for reforestation to occur in a timely manner (Chapter 2.3).

- \* *Endangered Species Act*: As per BLM State Office Instructional Memorandum No. OR-97-061, the applicable Reasonable and Prudent Measures/Conservation Recommendations contained within the National Marine Fisheries Service March 18, 1997 Biological Opinion and Conference Opinion were incorporated into the design features of Alternatives 2, 3 and 4 (Chapter 2.3).

Section 7 Consultation with the National Marine Fisheries Service is in progress. A Biological Assessment has been prepared and submitted to the Willamette Province Level I Team in accordance with the Streamlined Consultation process. A final decision on this project will not be made until a Biological Opinion is received from NMFS. Changes in project design features may be required as a result of Terms and Conditions contained within the Biological Opinion.

This project was included within the North Coast Province Programmatic Biological Assessment for Fiscal Year 2000 Projects which would Modify the Habitats of Bald Eagles, Northern Spotted Owls and Marbled Murrelets which was submitted to the U.S. Fish and Wildlife Service and dated September 9, 1999. A Biological Opinion covering this project was received from USFWS dated October 26, 1999. All action alternatives design features comply with the Terms and Conditions contained within the Biological Opinion.

#### 4.0 List of Interdisciplinary Team Members, Preparers and Support Staff

<b>Table 14. List of Interdisciplinary Team Members, Preparers and Support Staff</b>		
<b>NAME</b>	<b>TITLE</b>	<b>RESOURCE</b>
Steve Bahe	Wildlife Biologist	ID Team Leader, Wildlife
John Caruso	Contract Administrator	Cultural Resources
Suzanne DiGiacomo	Botanist	Botany, Noxious Weeds
Walt Kastner	Silviculturalist	Silviculture
Bill Hatton	Forester	Timber, Preliminary Logging Systems
Ron Pace	Natural Resource Specialist	Wildlife & Fungi
Dave Roche'	Forester	Silviculture
Larry Scofield	Wildlife Biologist	Botany, Noxious Weeds
Katrina Symons	NEPA Coordinator	NEPA
Kevin Tiegland	Forester	Timber, Logging Systems
Lynn Trost	Engineering Technician	Engineering
Bill Wais	Forester	Logging Systems
Matt Walker	Natural Resource Specialist	Fisheries
Cindy Weston	Fisheries Biologist	Fisheries
Dennis Worrel	Natural Resource Specialist	Soils & Hydrology

#### 5.0 CONSULTATION and PUBLIC INVOLVEMENT

See chapter 1.6 - Issues and Units of Measure for a discussion of the public involvement process and chapter 3.7 - Conformance With Land Use Plans, Policies, and Programs for a summary of ESA consultation with NMFS and USFWS.

Appendix 9 will contain the public comments, and BLM responses to those comments, received in response to the 30-day public comment period for EA OR-086-99-03.

## 6.0 GLOSSARY

***Aquatic Conservation Strategy Objectives*** - The Aquatic Conservation Strategy (ACS) was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. The four components of the Aquatic Conservation Strategy (Riparian Reserves, Key Watersheds, Watershed Analysis, and Watershed Restoration) were developed to meet the nine ACS objectives. (See pages 5-7 of the Salem RMP for a listing of the ACS objectives, or Appendix 7 of this EA)

***Coarse Woody Debris*** - Tree or portion of a tree that has fallen or was cut and left in the woods to contribute to a variety of ecosystem functions. Usually refers to pieces at least 20 feet long and 20 inches in diameter at the large end.

***CWD*** - See “Coarse Woody Debris.”

***DBH*** - See “Diameter at Breast Height.”

***Diameter at Breast Height*** - The diameter of a tree 4.5 feet above the ground on the uphill side of the tree.

***Environmental Analysis*** - A systematic process of developing reasonable alternatives and predicting the probable environmental consequences of a proposed action and the alternatives.

***Environmental Impact Statement*** - A formal document to be filed with the Environmental Protection Agency that considers significant environmental impacts expected from implementation of a major federal action; a detailed written statement as required by section 102(2)(C) of the [National Environmental Policy] Act, as amended (40 CFR 1508.11).

***ESU*** - see “Evolutionarily Significant Unit”

***Evolutionarily Significant Unit*** - A population that is reproductively isolated from other conspecific populations and represents an important component in the evolutionary legacy of the biological species.

***General Forest Management Area*** - A BLM sub-category of the Matrix land allocation as described within the Salem District RMP.

***GFMA*** - See “General Forest Management Area”

***IDT*** - See “Interdisciplinary Team.”

***Interdisciplinary Team*** - A group of environmental experts specializing in a range of disciplines, who conduct the environmental analysis.

***Matrix*** - A federal (BLM and USFS) land allocation which is managed to meet several objectives

including but not limited to, the production of a sustainable supply of timber and other forest commodities to provide jobs and contribute to community stability.

**MMBF** - Million Board Feet. A board foot is a unit of measure used to quantify commercial lumber; it measures 1 foot x 1 foot x 1 inch.

**MBF** - Thousand Board Feet. A board foot is a unit of measure used to quantify commercial lumber; it measures 1 foot x 1 foot x 1 inch.

**National Environmental Policy Act** - The basic national charter for the protection of the environment. It establishes policy, sets goals (section 101), and provides means (Section 102) for carrying out the policy.

**NEPA** - See “National Environmental Policy Act”

**New road construction** - Construction of a road where there previously has not been a road. ie: no indication of an historic road bed (indicators may include: excavation scaring and human caused alteration of the topography; vegetation such as alder growing in or along the old road; indications of a rocked surface or soil compaction; or altered flow of surface water not attributed to natural causes.

**O & C Lands** - Lands which were granted to the Oregon and California Railroad Company in 1866 but which have been revested to the federal government.

**Permanent road** - Permanent roads are those roads that are used and/or not decommissioned after the contract is terminated.

**Riparian Reserve** - A federal (BLM or USFS) land allocation which overlays all other land allocations. The allocation is a key component of the Aquatic Conservation Strategy which was developed to restore and maintain the ecological health of watersheds and aquatic ecosystems contained within them on public lands. Lands within this allocation are located along permanent and intermittent streams where special standards and guidelines direct land use.

**Road** - A transportation facility originally constructed to be used primarily by vehicles having four or more wheels. It is documented as such by the owner, and [may be] maintained for regular and continuous use (CFR 9100). The level of maintenance is generally dependent on available funding.

**Road Reconstruction** - Work done, in varying amounts, to an existing road (bed) which restores it to a condition that meets present need and construction standard. Reconstruction may incorporate some of the following: brushing, clearing and grubbing, excavation, widening, rocking, blading, subgrade compaction, ditching, culvert placement or replacement, waterdips, stabilization & erosion prevention methods.

**Semi-permanent road** - Semi-permanent roads are those roads that used for longer than one dry season but are decommissioned by the end of the contract.



**Soil compaction** - The increase in soil density (reduction of total porosity) that results from the rearrangement of soil particles in response to applied external forces such as traffic by heavy machinery.

**Soil displacement** - The mechanical movement of the upper organic and mineral surface by equipment and movement of logs. It involves excavation, scalping, exposure of mineral soil and burial.

**Snag** - Any standing dead, partially dead, or defective (cull) tree at least 10 inches in diameter at breast height (DBH), although it usually refers to trees and at least 15 inches at DBH and at least 20 feet tall. A hard snag is composed primarily of sound wood. A soft snag is composed primarily of wood in advanced stages of decay and deterioration, generally not merchantable.

**Temporary road** - Temporary roads are those roads which are built, used and decommissioned during the same dry season (usually June 15 to October 15).

## **7.0 BIBLIOGRAPHY**

Bowling, L.C., and D.P. Lettenmaier. 1997. Evaluation of the Effects of Forest Roads on Streamflow in Hard and Ware Creeks, Washington. TFW-SH20-97-001, Water Resources Series Technical Report No. 155, University of Washington, Seattle.

Harr, D.R., W.C. Harper, J.T. Krygier, and F.S. Hsieh. 1975. Changes in Storm Hydrographs After Road Building and Clear-Cutting in the Oregon Coast Range. Water Resources Research 11(3).  
USDA Soil Conservation Services. 1986. Soil Survey of Columbia County, Oregon.

USDI Bureau of Land Management. 1996. *East Fork Nehalem Watershed Analysis*. 59pp + appendices.

USDI Bureau of Land Management. 1996. *Scappoose Creek Watershed Analysis*. 66pp + appendices.

USDI Bureau of Land Management. *15% Analysis Documentation in conjunction with the 3rd year Evaluation on the Salem District RMP* updated 11/15/99 - Copy available at the BLM Tillamook Resource Area Office, 4610 3<sup>rd</sup> Street, Tillamook OR., 97141

Washington County Soil and Water Conservation District and USDI Bureau of Land Management 1999. *Dairy-McKay Creek Watershed Analysis*. 125pp + appendices.

## APPENDIX 1

### Powerline Dairy Issue Disposition

BLM Responses to Public Comments  
which resulted from the December 16, 1998 Scoping Report

Project Report Document 17 - comment #1

Rex M. Lebow, Avison Lumber Co., Molalla OR.

Page 6, Paragraph 4.14 - By my calculation there will be about 1.5 miles of natural surface road to be used as a haul route. However, according to Page 9, Paragraph 4.3.2, operations within the thinning areas are prohibited from May 1 to August 1. This leaves, at best, about three months of hauling weather over the unrocked roads. If it is necessary to have this short of an operation period, it must be reflected in the appraisal with additional moves-in and out allowed for, as well as a longer sale term than normal.

#### BLM RESPONSE:

As the proposed action has developed there have been some adjustments in the proposal from what was contained within the December 16, 1998 scoping report. Some of these changes have been made in response to comments from interested members of the public. The proposed action is expected to utilize approximately 3,920 feet of natural surface road. (The majority of largest unit, unit 33-3 would be accessed by a rocked, ridgetop road enabling a longer harvest season in that portion of the unit.) This timber sale would be a three year contract to reflect the restricted time constraints. In our appraisals, the potential for additional move-in's are considered. It was also stated in paragraph 4.3.2 of the Scoping Report and carried through to the proposed action, that if the purchaser is able to demonstrate the ability to conduct the operation with minimal amounts of damage to the residual stand, the stipulation which prohibits operations during the bark-slip period may be waived.

*Note: Within the scoping report, the dates of the bark-slip period were cited as being from May 1 to August 1. While the timing of this period is often dependent upon yearly environmental conditions and it is difficult to predict exactly when the bark is most susceptible to damage, the dates of the bark-slip period have been adjusted to be April 1 and July 15 within the proposal which it is felt more accurately reflects the period of concern.*

Project Report Document 17 - comment #2

Rex M. Lebow, Avison Lumber Co., Molalla OR.

Page 7, Paragraph 4.17 - Subsoiling of natural surface roads, including additional roads within the project area, as well as skid roads to be determined by a hydrologist after harvest may present a timing problem for a purchaser. First of all, it would be impossible to make an accurate estimate of logging costs without knowing beforehand the approximate amount of skid roads to be treated. Secondly, because it is likely that more than one or two logging seasons will be used to harvest this sale, there may be a conflict between the need to subsoil and the need to reuse roads for more than one season. The

best way to avoid any problems is for the BLM to take the responsibility for subsoiling as a separate contract after the logging.

**BLM RESPONSE:**

The BLM appraisers develop a logging plan prior to advertisement of a timber sale, potential skid trails are mapped, measured and appraised for. Likewise, the advertised timber sale will reflect the surveyed length of the engineered natural surface and rocked roads to aid the potential purchasers in compiling their bids. The units which require the engineered natural surfaced roads are small enough to enable the purchaser to complete the harvest in the respective unit within the seasonal time frame without reopening a natural surfaced engineered road the following season. Although it is preferable to subsoil each natural surfaced engineered road immediately after harvesting the unit it accesses, it is not expected that all of the compacted surfaces will be subsoiled immediately after their use. An exception is within alternative 3, the road accessing unit 33-2 which must be built, utilized and decommissioned during the same season based upon its location within a Riparian Reserve. In order to reserve some flexibility, an appraisal allowance is given and specifications are developed to “winter over” one natural surfaced engineered road until it can be subsoiled with any other of the compacted surfaced roads the following work season.

A “buy-out clause” for sub-soiling may be considered however, based upon past experience, the best way for the BLM to assure that the sub-soiling is completed and that funds are available to perform the work, is to sub-soil the roads prior to the termination of the contract.

Project Report Document 17 - comment #3

Rex M. Lebow, Avison Lumber Co., Molalla OR.

Page 8, Paragraph 4.2.4. - Just a reminder that the 20 trees per acre to be left as CWD (Coarse Woody Debris) and such must be marked prior to cruising so as to not impact the volume.

**BLM RESPONSE:**

All trees needing to be retained to meet the requirements for wildlife trees and CWD are selected and painted prior to the units being cruised.

Project Report Document 18 - comment #1

Mark A. Kemp, Hampton Tree Farms, Inc., Willamina OR.

We at Hampton Tree Farms, Inc. appreciate the opportunity to comment on BLM timber sales. The Powerline Dairy sale on paper, appears to be a good sale for us. But as in Borderline Bear, there are several seasonal operating restrictions and the need to create coarse woody debris. These requirements continually make BLM sales more and more expensive and difficult for purchasers to make minimum bid.

**BLM RESPONSE:**

The seasonal restrictions are accommodated by a contract length of three years. The

BLM recognizes the additional costs and time associated with the need to create and yard over and around the coarse woody debris and therefor, *will appraise the sale for higher falling and yarding costs* based upon the expected slower production rates. Relative to the action described within the scoping report, CWD requirements have been considerably relaxed as a result, in part, to public comment.

Project Report Document 18 - comment #2

Mark A. Kemp, Hampton Tree Farms, Inc., Willamina OR.

Hampton Tree Farms, Inc. supports the BLM sale program and is dependent upon it for a portion of our raw materials. If there were a way the BLM could ease the restrictions and/or lower the minimum bid to compensate for the costs of operating within these restrictions, you would have more purchasers bidding on timber sales. Again Hampton Tree Farms, Inc. is very interested in this sale and will aggressively pursue it, if priced appropriately.

BLM RESPONSE:

We are pleased that Hampton Tree Farms Inc. is interested in our timber sale program. As you are aware, timber valuation is complex at best. The rules we operate under do not allow us to change minimum bid prices or lower selling prices of our timber below fair market value. Our timber sale appraisal system establishes a fair market value for our timber, and reflects our estimated costs of operations given the various project design elements. If any potential purchaser or interested public has specific questions regarding how we cost operations, those questions can be addressed to our timber manager at your discretion.

Project Report Document 19 - comment #1

Jeffrey E. Mather, Sweet Home OR.

Economic Problems: The first problem is that the logging industry is becoming so specialized that to find a “logger” that can do both ground skidder logging and tower logging at a competitive rate is very difficult. However a lumber mill that continuously purchases and harvests timber and has several different loggers working could mix and match loggers to the kind of logging required. So if the sale combines the tower logging and the ground skidder logging it would virtually eliminate the possibility of a small owner/operator from bidding on the timber sale.

BLM RESPONSE:

The BLM frequently offers sales that are set aside through the (SBA) Small Business Administration specifically for small business owners to bid on. The BLM appraisals take into account the specializations of the timber industry. Our appraisers use the latest information in determining the costs of operations which may include the rental of specialized equipment. The BLM has planned, sold and awarded sales to small business owners/operators and will continue to do so.

Project Report Document 19 - comment #2

Jeffrey E. Mather, Sweet Home OR.

I don't know how to keep skid trails 150 feet apart and still use a forwarder that can only reach 15-20 feet. I did see on an OSU timber sale where they allowed a delimber to sit on a skid trail, reach out into the unit and set the processed log on the skid trail then it was removed by a grapple skidder. This seemed to work ok, but one end of the log was dragged on the ground and in your Scoping Report you specified, 4.1.1. (g & h) Yarding shall be done with equipment capable of lifting and carrying logs fully suspended off the ground. Also, log landing and transfer points shall be limited to existing roads and turnouts, unless otherwise agreed to by the Authorized Officer.

**BLM RESPONSE:**

Section 4.1.1 contains stipulations for both ground skidding with skidders or crawlers, and for utilizing harvester/forwarder systems.

Skid trails are to be spaced no closer than 150 feet from each other. If a skidder or crawler is equipped with a winch containing 150 feet of cable, felling trees to lead should allow this spacing. When skidding, logs should be suspended at one end.

In relation to harvester/forwarder systems, it is stated in section 4.1.1(d) that forwarder trails be spaced no closer than 100 feet. It should be possible for a harvester to place logs along its path so that the forwarder only needs to utilize every other trail, thereby providing the 100 foot spacing between forwarder trails. When forwarding, logs are carried free from the ground in the bed of the forwarder as specified in section 4.1.1(g).

The transportation of logs is typically divided into three steps, primary, secondary and tertiary. Primary transportation moves the log from the stump to a landing area. Secondary transportation is when the log is transported from the landing to a processing facility. Tertiary transportation occurs after the log is received at the processing facility. The basic three leg break down identifies two transfer points for logs. The first, as stated above is from the landing to the secondary transportation system. In the case of the Powerline Dairy Project, the first point of transfer will be limited to existing roads and turnouts as specified in section 4.1.1(h).

Project Report Document 19 - comment #3

Jeffrey E. Mather, Sweet Home OR.

In 3.0 "Purpose and Need for the Action": The presence of *Phellinus weirii* was stated as the need for a small clear cut. I hope you make the clear cut large enough to completely stop the spread of root rot and even take out a few extra trees to make sure it stops. By doing so maybe our children won't have to deal with it.

**BLM RESPONSE:**

In the regeneration harvest portion of the Powerline Dairy Project, it is our intent to substantially reduce the amount of *Phellinus weirii* by removing susceptible tree species, and reforesting with tolerant and/or immune species. Within the thinning units, small patch cuts (generally less than 2 acres) would be placed to isolate the root pathogen from the adjacent, healthy portions of the stand. Typically this would involve

removing a ring of at least one healthy appearing tree beyond the visible infection center. While our action will not completely eradicate the disease, which is a naturally occurring organism, it is expected to greatly reduce its presence on the site. Complete eradication of the disease would be nearly impossible, however the proposed action would greatly reduce its presence on the site.

Project Report Document 19 - comment #4  
Jeffrey E. Mather, Sweet Home OR.

In 4.2.9, it sounds like you're cutting the same trees that are being replanted. Unless slashing all non-conifer vegetation includes something other than red alder and bigleaf maple.

**BLM RESPONSE:**

In the regeneration harvest portion of the Powerline Dairy Project, it is our intent to reserve all overstory hardwood trees as stated in section 4.2.5. In the case of preparing the site for reforestation, (scoping letter section 4.2.9) the slashing of non-conifer vegetation is intended to apply to woody shrubs and brush which are expected to compete with planted tree seedlings for available site resources. Understory hardwoods and understory trees of disease susceptible species would be slashed along with the brush. Understory hardwoods, growing under a conifer canopy, typically do not respond well to release; in many cases they suffer from severe sun scalding resulting in poor growth and poor wood quality. Planted hardwood seedlings on the other hand grow rapidly, and will not suffer from sun scald or deformation resulting from years of growing in an understory situation. The rapid growth and superior wood quality of the planted hardwood seedlings would more than compensate for any loss of advanced growth in the existing understory hardwood trees.

Project Report Document 22 - comment #1  
George Sexton, American Lands Alliance, Portland OR.

Restoration Alternative. Please include at least one alternative that contemplates restoration in favor of commercial timber harvest. Such an alternative not only provides a meaningful base-line with which to compare the extraction alternatives, but also offers the agency an opportunity to improve watershed health and resiliency. Examples of such alternatives may be found in the Summit timber sale in the Malheur National Forest and the Fish Creek Restoration Project in the Mt. Hood National Forest.

***note:*** In a phone conversation on February 11, 1999, (see Project Record Document # 25) Mr. Sexton explained to Steve Bahe (IDT Lead) what he meant by a "Restoration Alternative". He asked that the alternative restore the following: 1) Hydrologic Function; 2) Fish Habitat; 3) Natural Sediment Regime; 4) Natural Peak Flow/Low Flow Cycles; and 5) Habitat and Connectivity for Survey and Manage Species. In addition, he reiterated that the restoration alternative should include no commercial timber harvest.

**BLM RESPONSE:**

We have obtained copies and reviewed the referenced alternatives found within the Summit timber sale in the Malheur National Forest and the Fish Creek Restoration Project in the Mt. Hood National Forest.

The suggested “restoration alternative” is not responsive to the purpose and need for action. Specifically, without using the commercial timber harvest tool, the IDT knows of no other way to decrease the spread of *Phellinus weirii*, enhance the future timber production capability of the area, and improve individual tree growth and stand vigor. As such, your alternative is outside the scope of this analysis. Additionally, the Bureau does not agree with your statement that such an alternative would provide a meaningful base-line to compare the extraction alternatives. Specifically, in accordance with regulation, the No action alternative sets the environmental baseline for comparing effects of the action alternatives.

Streams within Section 33, which contains the proposed project area, are mostly small, high gradient head water streams with an abundance of large legacy wood within the channel as a result of past fires and salvage logging. The majority of these streams are not fish bearing, and all have been determined to have adequate quality and quantity of aquatic habitat. Several restoration activities are included within the proposed action, including decommissioning roads for a net decrease in road mileage within the watershed, and removing fill on a log culvert that is expected to eventually fail. These activities would help restore the natural sediment regime and peak/base flows however, a measurable change is not expected.

Compliance with the Standard and Guidelines for the land allocations (including survey and manage provisions) will assure that habitat and connectivity concerns for Survey and Manage Species are addressed (also see Northwest Forest Plan page B-1, and BLM response to comment 22-4).

Project Report Document 22 - comment #2

George Sexton - American Lands Alliance, Portland OR.

Roads. ALA believes that there are already far too many roads present on federal forest lands than can be maintained in a safe and ecologically sound manner. Even temporary roads often have long-term impacts on hydrology and soil compaction. Please consider alternatives that do not require any further road construction and explore every opportunity to limit road construction as much as possible.

**BLM RESPONSE:**

As a result of this comment, as well as from additional “roads related” questions from Kim Gossen, Coast Range Association (Project Record Document #23), a soil and water issue was identified, and seven preliminary alternatives in addition to the proposed action were developed to resolve that major issue. Five of these preliminary alternatives were dropped from detailed analysis. Two of these alternatives reduced the amount of road construction and will be analyzed in detail in the Environmental Assessment.

Of the five preliminary alternatives which were dropped from detailed analysis, one alternative entailed **no** new road construction. The IDT determined that an alternative resulting in “no new road construction” would not meet the purpose and need for action based upon the limited acreage which could be treated. Moreover, if the IDT had analyzed in detail an alternative that had no new road construction, the efforts would be similar to the “no action alternative” since “no new roads” would result in only approximately 8 or 9 acres of forest land to be subject to commercial thinning harvest.

As a result of the further work in project development to minimize road construction, the proposed action was changed by the IDT to result in less road construction than what was reported within the December 16, 1998 Scoping Report.

Project Report Document 22 - comment #3

George Sexton - American Lands Alliance, Portland OR.

Substantive no action alternatives. The no action alternative should not be a simple “throw away” procedure. Please give the no action alternative the same level of analysis as the action alternatives. The no action alternative should be documented in such a manner as to help the reader understand the relative environmental impacts of the action alternatives and the no action alternative. The Decision Maker should not rule out the no action alternative before an unbiased NEPA process is completed.

**BLM RESPONSE:**

Regulation requires the alternative analysis in an environmental document to include the alternative of “no action”. There are two interpretations of the no action alternative. One interpretation is continuing current management and the other interpretation is not doing the proposed action. The Powerline Dairy IDT used the latter interpretation in the development of the no action alternative which was analyzed in EA Number OR-086-99-03. This no action alternative was used by the IDT to set the environmental baseline for comparing effects of the action alternatives.

The Powerline Dairy IDT is well aware of their responsibility to rigorously explore and objectively evaluate each alternative. It is the intent of the IDT to conduct an unbiased environmental analysis that provides sufficient information so that the deciding official, Tillamook Resource Area Manager, can make an informed decision and determine whether an action may have significant environmental effects.

Project Report Document 22 - comment #4

George Sexton - American Lands Alliance, Portland OR.

Connectivity. The use of timber stands for wildlife connectivity is an important issue to ALA. Please document and explain the habitat connectivity functions provided by the stands identified in the NEPA documentation. Please explain the types of animals and the times of year when the stands are used for connectivity.

**BLM RESPONSE:**



Connectivity is an important issue to the BLM as well.

The analysis necessary to determine the impacts of a particular management strategy upon the health of a particular species or population is most appropriately conducted at a watershed, landscape or regional scale. Much of this regional analysis was conducted prior to and between the Draft and Final SEIS (Supplemental Environmental Impact Statement) for the Northwest Forest Plan and in effect, was part of the analysis which resulted in the formation of the Survey and Manage species lists and management strategies.

This project proposal is consistent with the land use allocation's objectives and the project types considered within the analysis for the Northwest Forest Plan and the Salem District RMP (Resource Management Plan). As appropriate, the EA will contain a discussion of the effects of the various alternatives upon the species of concern. Since there are no unique or unusual situations (relative to connectivity) resulting from site specific conditions, the ownership pattern, known sites of species of special concern, or landscape character, there are no impacts to wildlife habitat connectivity expected to result from the implementation of the proposed action which would be outside those already disclosed within the NFP SEIS and Salem District FEIS.

Project Report Document 22 - comment #5

George Sexton - American Lands Alliance, Portland OR.

Timeliness of surveys. Please ensure that plant and animal surveys are done during the time of year when the looked for plant or animal is most likely to be found. It is very important that these surveys be done in a timely enough manner that the BLM is not committed to implementing the sale by the time surveys are commenced.

**BLM RESPONSE:**

The BLM is committed to the goals and objectives of the Northwest Forest Plan and Salem District RMP which includes the management of a wide range of species and their habitats. When available, the BLM follows approved survey protocols which define the timing or conditions when surveys should be conducted. Where survey protocols are lacking, (such as for several category 1, 3 and 4 species) BLM staff specialists utilize their professional judgement as well as input from experts and agency guidance to maximize the effectiveness of the survey effort.

Botanical surveys (for lichens, bryophytes, fungi, and vascular plants) within the proposed Powerline Dairy Timber Sale were conducted to protocol in June, July, August and October 1998 and during May, June, October, November and December 1999. Protocols utilized for botanical S&M surveys include: *Survey Protocol for Bondazewia mesenterica* (=B. montana), *Otidea leporina*, *O. onotica*, *O. smithii*, *Polyozellus multiplex*, *Sarcosoma mexicana*, and *Sowerbyella* (=Aleuria) *rhenana*. Version 1.2 by Thomas E. O'Dell, October 1999; *Survey Protocols for Protection Buffer Bryophytes*. Version 2.0, December 1999; *Survey Protocols for Survey and Manage Strategy 2 Vascular Plants*. Version 2.0, December 1998; and *Survey Protocols for*

*Component 2 Lichens*. Version 2.0, March 12, 1998.

Surveys are scheduled to continue into 2000 for the October to December time period for fall fungi. Subsequent S&M fungus surveys would be conducted in units 33-1 and 33-2 in accordance with the *Final Supplemental Environmental Impact Statement For Amendment to the Survey and Manage, Protection Buffer, and other Mitigating Measures Standards and Guidelines* (expected summer 2000). Any newly discovered sites would be managed appropriately, (e.g. with consideration to the management recommendations contained within Appendix J-2 of the NFP) to avoid adverse impacts. If additional surveys and subsequent mitigation result in substantial change to the proposal, a supplemental analysis will be conducted in accordance with NEPA and released to the public for comment.

Fisheries inventories were conducted in and downstream of the project area on March 30<sup>th</sup> and April 7<sup>th</sup> 1998. Procedures followed adhered to the Salem District Draft guidance "*Field Procedure for the Verification of Fish-bearing Streams on the Salem District*" dated January 31, 1996.

Survey and Manage mollusk surveys for Powerline Dairy Project were conducted from April 24<sup>th</sup> to June 18<sup>th</sup> 1998; October 14<sup>th</sup> to November 5<sup>th</sup> 1998; and May 13<sup>th</sup> and 14<sup>th</sup> 1999. "*Survey Protocol for Terrestrial Mollusk Species from the Northwest Forest Plan*" (Draft Version 2.0, Oct. 29, 1997) was followed for all surveys. See Appendix 3 for details.

Red tree vole surveys were conducted according to protocol (*Interim Guidance for Survey and Manage Component 2 Species: Red tree Vole* BLM-IM OR-97-009 and OR-98-105) during September 1999. None were located.

Project Report Document 22 - comment #6

George Sexton - American Lands Alliance, Portland OR.

Watershed Analysis. ALA encourages the BLM to avoid timber harvest and road building that may impact hydrological functions and water quality before the watershed analysis is completed. We are especially concerned with potential harvest within riparian reserves and the construction of logging roads before a final WA is available.

**BLM RESPONSE:**

The proposed project will not be implemented prior to the finalization of the WA (Watershed Analysis). Although the WA was not completed for distribution to the public while some of the planning for the Powerline Dairy project was occurring, the Resources Area staff's involvement in the process of the watershed analysis has assured that the proposed action is fully consistent with the completed WA. The Dairy-McKay WA was completed in March of 1999.

Project Report Document 23 - comment #1

Kim Gossen, Coast Range Association, Corvallis OR.

What is the current road density within the watershed?

BLM RESPONSE:

The number of mapped roads per square mile is approximately 4.3 within the Dairy-McKay watershed (about 4.0 within the 6<sup>th</sup> field watershed). Among BLM lands within the Dairy-McKay watershed, there are approximately 1.6 miles of mapped road per square mile of land. Analysis of aerial photography on another watershed with our Resource Area revealed that approximately an additional 40% of roads (legacy roads and new roads) present but were not included on the GIS database. Assuming that the percentage of uncounted roads in this watershed are the same as the one analyzed, there are approximately 6.0 miles of roads per square mile in the watershed (about 5.6 miles of roads per square mile within the subwatershed)

Project Report Document 23 - comment #2

Kim Gossen, Coast Range Association, Corvallis OR.

Would 2,500 of 7,400 feet of new road be considered permanent if rocked?

BLM RESPONSE:

As stated in our response to a previous comment, as the proposed action has developed there have been some adjustments in the proposal from what was contained within the December 16, 1998 scoping report. In this analysis, 1,700 feet of rocked road is the maximum road distance analyzed for impacts associated with engineered rocked roads. A portion of this total length (1,340 feet) is considered to be reconstruction rather than new construction. All 1,700 feet of rocked roads will be considered permanent since the proposal does not include decommissioning.

Project Report Document 23 - comment #3

Kim Gossen, Coast Range Association, Corvallis OR.

2,800 feet would be *improved*, does that means it will be maintained as permanent?

BLM RESPONSE:

Again, some portions of the project have changed since the Scoping Report. The only roads to remain permanent are those rocked roads discussed above in response to Document 23, comment #2. All natural surface roads would be decommissioned at the completion of the project.

Project Report Document 23 - comment #4

Kim Gossen, Coast Range Association, Corvallis OR.

In total this project proposes building approximately one mile of new permanent road?

BLM RESPONSE:

The project proposes to build a total of 360 feet of *new* road and to reconstruct, including rocking, 1,340 feet of existing road which will not be decommissioned and will therefore be considered permanent. In addition, the project proposes to build approximately 3,920 feet of road which will be decommissioned at the completion of the

project as well as decommission an additional 2,500 feet of existing legacy roads. As a whole, the proposed project results in a net loss of 800 feet of road within the project area. Also see response to comment 23-2.

Project Report Document 23 - comment #5

Kim Gossen, Coast Range Association, Corvallis OR.

Will some distance of road be decommissioned in the same watershed in order to mitigate the impact of this new road building and road improvement? If so, where, when, and how much of it?

**BLM RESPONSE:**

All natural surfaced engineered roads which are either newly constructed or existing roads which are reconstructed for reuse would be subsoiled (decommissioned) at the termination of the sale. The newly constructed and reconstructed engineered rocky roads would be mitigated by decommissioning two existing “legacy” roads totaling approximately 2,500 feet in length. These roads are located within the same section as the harvest operation (see EA Figure 2) with decommissioning work being completed prior to termination of timber sale contract.

*note: An additional existing road segment approximately 1,000 feet long within the sale unit was also evaluated for decommissioning but it can not be subsoiled due to an easement held by the Bonneville Power Administration.*

Project Report Document 23 - comment #6

Kim Gossen, Coast Range Association, Corvallis OR.

Have any federally listed salmon species been detected within the sale area?

**BLM RESPONSE:**

At the time the scoping report was sent out there were no federally listed fish species in the Dairy Creek watershed. On May 24, 1999, Upper Willamette steelhead trout and Upper Willamette chinook salmon were both federally listed as threatened under the Endangered Species Act. Steelhead are not found within the proposed project area. Though data on steelhead distribution in the Dairy Creek watershed is limited, the best estimate is that occupied steelhead habitat is located approximately 0.5 miles or more downstream of the proposed project area. Though the action area falls within the Upper Willamette chinook salmon ESU area, chinook have not been documented, currently or historically, within the Dairy Creek drainage. Cutthroat trout, sculpin and western brook lamprey were collected during presence/absence surveys conducted in 1999 on the streams within the Powerline Dairy project area.

Project Report Document 23 - comment #7

Kim Gossen, Coast Range Association, Corvallis OR.

What age is the stand; what is the age distribution of stands within this fifth field watershed, and what percentage of the federal stands are 80+ years old? It would enlighten this issue considerably if you provided a narrative on how harvesting a 55-60

year old stand relates to the latest REO directions on retention of 15% 80+ y.o. stands on federal lands within 5<sup>th</sup> field watersheds. Specifically, if the minimum threshold cannot be met for 80+ stands in a given watershed, is it consistent with the NFP to regeneration harvest the next highest age class?

**BLM RESPONSE:**

The forested stands impacted by the proposed Powerline Dairy project are 60-70 years old. The 15% analysis of the Dairy Creek 5<sup>th</sup> field watershed (see *15% Analysis Documentation in conjunction with the 3rd year Evaluation of the Salem District RMP* updated 11/15/99 - a copy is located at the Tillamook RA office) shows that 95% of the federal forested acres within the watershed are less than 80 years old, with the majority of the stands in the 50 and 60 year age classes. All late successional forest (LSF) stands, patches and fragments have been mapped and will be deferred from regeneration harvest for approximately 20 - 30 years, after which a reevaluation of the LSF within the watershed will be made. Additional stands located within the Riparian Reserve land allocation that are currently 70 years old have been identified for retention to develop LSF characteristics and at some future date to help meet the 15% Standard and Guide (S&G). These additional stands bring the total for the watershed to 16% of federal forested acres.

The Matrix lands being proposed for regeneration harvest or thinning treatment as a part of this project have not been identified as LSF and therefore will not have any impact on meeting the 15% S&G in the watershed. The Riparian Reserve stands within the Dairy-McKay watershed which are 70 years old or older, including the 16 acres proposed for treatment, have been identified to help meet the 15% S&G. The proposed treatment will promote the development of late-successional forest characteristics in these stands, which will contribute to achieving the goals of the 15% S&G earlier than if these stands were left to develop on their own.

Project Report Document 23 - comment #8

Kim Gossen, Coast Range Association, Corvallis OR.

A suggestion about how to present info about Survey and Manage species: a table listing which species BLM has surveyed for and indicating which (if any) were found and what is being done to manage those sites. Either included in the table or simply listed, it would be helpful to know which species whose habitat range possibly includes Powerline Dairy sale area have not been surveyed for.

**BLM RESPONSE:**

Thank you for your suggestion. It will be considered.

## APPENDIX 2 Silvicultural Prescription for the Project

### Silvicultural Prescription: Powerline Dairy Timber Sale

**Preparer:** David M. Roché

**Date:** 1 July, 1999

**Location:**

Legal: T.4N., R.3W., Sec. 33, W.M.

County: Columbia

Land Designation:

Watershed: The proposed treatments are located in the Dairy Creek Watershed. The main stem of the East Fork of Dairy Creek bisects the section. A Watershed Analysis for this area was completed in February 1999.

**Estimated Units:** Unit 1. 29 acres regeneration harvest in OI units: OI911076, OI911106  
Unit 2. 16 acres commercial thinning in OI units: OI911110, OI911109, OI911111, OI911106  
Unit 3. 61 acres commercial thinning in OI units: OI911119, OI911106, OI911115, OI911098, OI911097, OI911125, OI911094, OI911118

**RMP Land-Use Allocation:** Matrix/GFMA

The objectives specified in the Salem district RMP on page 20 for this land use allocation are (in order of occurrence in RMP):

- C Produce a sustainable supply of timber and other commodities to provide jobs and contribute to community stability.
- C Provide connectivity (along with other allocations such as Riparian Reserves ) between Late-Successional Reserves.
- C Provide habitat for a variety of organisms associated with both late-successional and younger forest..
- C Provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, and maintenance of ecologically valuable structural components such as down logs, snags and large trees.
- C Provide early successional habitat.

Meeting these objectives will also help to meet the planned timber sale volume for the Tillamook Resource Area PSQ (Probable Sale Quantity).

**Site Characteristics:**

**Topography:**

The units are located on ridge tops and mid to upper slopes. The main stem of the East Fork of Dairy Creek bisects the section in a generally north-south fashion. Units 1 and 2 are east of the creek and Unit 3 is west of the creek. There is also a Powerline bisecting the section which divides Unit 3 into two portions. Elevations within the treatment units range from 1300 feet up to 1700 feet at the top of the ridge in Unit 3. Slopes in the area range from less than 5% on the benches and ridge tops, to over 80% on the slopes adjacent to the East Fork of Dairy Creek. Units 1 and 2 drain directly into the main stem and Unit 3 drains into an un-named tributary of the East Fork of Dairy Creek.

**Soil:**

The soils in all of the treatment units are classified as Tolany loam. This is a deep well drained soil formed from silty colluvium. The main limitations of this soil are susceptibility of the surface layer to compaction, the moderate to high hazard of water erosion, and plant competition (Smyth, 1986). If ground based logging equipment is used, it should be confined to pre-approved equipment/skid roads, and operations should be limited to periods of low soil moisture. This soil is prone to displacement of the surface layers when it is dry and puddling when it is wet (Smyth, 1986).

**Stand History:**

GLO notes from 1917 and 1938 show little merchantable volume due to numerous wildfires in the area (Project Record Documents 1 and 2). The current stand was naturally regenerated following these fire events. Two timber sales which removed fire killed as well as some green trees from the SW quarter of the unit occurred in 1953 and 1954. A timber sale and snag felling contract was sold in late 1959 that further treated the SW quarter and also included clear cut harvest of the areas adjacent to Bacon Road as well as snag felling in the remainder of the section. Historical records indicate that 4,680 snags were felled during the 1959 action. For all three of these actions, harvest was accomplished using cable and tractor systems. Reforestation following the 1959 action was attempted by planting 30,000 Douglas-fir seedlings in the areas along Bacon Road, however, the reforestation effort was generally unsuccessful as evidenced by the nearly pure alder stands in these areas. During the late 1970's cedar shake bolts were harvested using helicopters.

**Forest Disease and Insects (General):**

Laminated Root Rot: Aerial surveys conducted in the late 1980's found that the presence of the Laminated Root Rot caused by the fungus *Phellinus weirii* (PW) varies through out this area. PW destroys the root systems of Douglas-fir and grand fir, reducing structural stability, root hydraulic function and timber volume production. Over the course of a rotation of timber, PW infection can decrease Douglas-fir volume production by as much as 40% - 70%, when compared to uninfected stands (Thies and Sturrock, 1996). This pathogen is a facultative saprophyte, and persists in the soil for at least 50 years in the roots and stumps of dead trees (Hadfield et al., 1986, Thies and Sturrock, 1995). The disease spreads when the uninfected roots of a susceptible tree species comes in contact with infected roots or stumps (Hadfield et al. 1986, Thies and Sturrock, 1995). Therefore, the presence of PW may limit both potential stand treatments and the tree species utilized for reforestation. Douglas-fir, and grand fir are highly susceptible, western redcedar is tolerant, western hemlock is resistant and hardwoods such as Red alder and Bigleaf maple are immune to the disease (Thies and Sturrock, 1994). PW infection can directly kill Douglas-fir trees or it can stress the tree predisposing it to attack by a secondary agent such as the Douglas-fir beetle (*Dendroctonus pseudotsugae*).

For this treatment the presence of PW was determined by integrating the results of the 1980's survey with recent site evaluations.

Douglas-fir beetle: The Douglas-fir beetle is a common secondary agent that kills Douglas-fir trees 12-inches DBH and above that are infected by PW, *Armillaria spp.* or other tree weakening agents (Hostetler and Ross, 1996; USDA FS, No Date; Partridge and Bertagnolli, Unpublished). This beetle typically infests disease weakened trees and down logs for brood development, however, if large amounts of down wood become available the population levels may grow to the point that adults will attack and kill healthy trees (Hostetler and Ross, 1996).

*Armillaria spp.*: *Armillaria* root disease commonly attacks weakened, suppressed understory trees. Several severely suppressed trees were found throughout the treatment areas that exhibited signs of *Armillaria* infection. This disease can also lead to secondary infection or infestation by the Douglas-fir beetle.

Swiss Needle Cast: Swiss needle cast (SNC) is caused by the native fungi *Phaeocryptopus gaumanni*, that infects Douglas-fir needles causing decreases in stomatal conductivity and eventual needle loss and growth reduction. Swiss needle cast currently is a major problem in the coastal fog belt, and disease severity appears to be increasing throughout northwestern Oregon west of the Cascade Summit. SNC has not been identified in the specific units comprising the Powerline Dairy Project at this time. Levels of SNC infection appear to be moderate in many of the Douglas-fir plantations throughout the general area. The presence of SNC should be considered when recommending treatments in stands comprised of susceptible species and in the consideration of species to utilize for reforestation efforts.

### Riparian Reserves:

Under the NWFP, the 100 year site indices, a measure of the productive capacity of the growing site for timber species, influences the required riparian reserve widths. The site indices and associated riparian reserve widths for the Powerline Dairy harvest units are summarized in Table 1.

**Table 1** Fifty and 100 year site indices and associated Riparian Reserve widths by harvest unit, based on site specific stand exam data.

Unit	50 year site index <sup>1</sup>	100 year site index <sup>2</sup>	Riparian Reserve Width (Feet)
1	123	154	200
2	115	143	200
3	125	157	200

<sup>1</sup>King, 1966; <sup>2</sup>McArdle, 1961

### Stand Descriptions (Current Condition):

#### Unit 1

##### Matrix Stand Condition:

Unit 1 is classified as moderately stocked, 70 year old Douglas-fir overstory with a poorly stocked 30 year old Douglas-fir understory component. The Timber Production Capability Classification (TPCC) for this unit indicates that a disease problem exists on the site. Stand exams were conducted to collect site specific data in the treatment area and indicate that Unit 1 is comprised of 93% Douglas-fir and 7% western redcedar. Unit 1 is summarized in Table 2. Diameters range from 7 to 26 inches with the bulk of the stand falling between 6 and 16 inches and SDI (Stand Density Index) of 363 indicating an overly dense condition. The stand exam results averaged the stand age class for the treatment area at 50 years. Site visits also revealed a minor component of bitter cherry and red alder as well as scattered grand fir and western hemlock.

The surveys which are described above indicate that this unit is being severely impacted by *PW* at this time. It is estimated that up to 80% of this stand is currently infected with the disease, a level which is considered extreme. The extreme level of infection may limit treatment as well as reforestation options.

The stand exams indicate that this unit has few, if any, Douglas-fir snags. The coarse woody debris transect of the stand exam indicates approximately 2,280 lineal feet of decay class 3 and 4 logs ranging from 16 - 51 inches large end diameter, however none of this wood meets the NWFP standards for down logs in Matrix regeneration harvest due to it's advanced stage of decomposition.



The understory shrub layer in Unit 1 is fairly well developed. The primary shrub species are Salal, Red Huckleberry, Dwarf Oregon Grape, vine maple, Ocean spray, and dogwood. The herb layer includes Oregon oxalis, Bleeding Heart, northern bedstraw, mosses, coltsfoot, vanilla leaf, bracken fern, wood violet, twin-flower, wild strawberry, pathfinder and inside-out-flower. There are currently no official plant association guides encompassing the area in which this action is located. However, there is a draft plant association guide available which includes the Coast Range of the Salem District, BLM. The common plant association classification for this unit is the Douglas-fir/salal type (McCain and Garza, 1998). The project planning area was surveyed for special status plants in the fall of 1998. During that survey no Survey & Manage plant or fungal species were identified in or near the area proposed as Unit 1 (Project Record Document 9).

**Table 2** Unit 1 stand summary information, estimated from the initial stand condition as described by the Organon model using Atterbury Stand Exam Data.

Species	TPA <sup>1</sup>	QMD <sup>2</sup> (Inches)	BA/AC <sup>1</sup> (sq. ft)	SDI <sup>3</sup>	RD <sup>4</sup>	Bd Ft/Ac <sup>1</sup> (Scribner)	Cubic Ft/Ac <sup>1</sup>
Douglas-fir	224	12.8	226	357	60	47,000	8489
Western redcedar	16	2.7	1	2	0.4	0	0
Stand	240	12.4	227	363	61	47,000	8489

<sup>1</sup> From Organon model; <sup>2</sup> Diameter of the tree of average basal area; <sup>3</sup> Reineke (1933); <sup>4</sup> Curtis (1982).

#### **Riparian Reserve Stand Condition:**

A qualitative assessment of the riparian reserve forest condition adjacent to Unit 1 was conducted to augment the quantitative data in the stand exam. At the current time the mixed alder and Douglas-fir is developing nicely. Douglas-fir are encroaching on the alder strip along the banks of the creek, providing horizontal as well as vertical structure. Shrub development is good, and contains red huckleberry, Oregon grape, sword fern, and devils club. The species compositions and the extent of *PW* in the up slope portion of the riparian reserve is essentially the same as that found within the adjacent treatment unit.

#### **Unit 2**

##### **Matrix Stand Condition:**

The BLM TPCC class for this unit is D=1930 and HC RA=1930. This indicates a moderately stocked, 70 year old Douglas-fir stand with a well stocked, 70 year old red alder component. The TPCC classification for this unit is the same as that specified for Unit 1, RPR1. Unit 2 is summarized in Table 3. The stand exams report an average stand age of 60 years, as opposed to the 70 years indicated on the type maps. This stand is comprised of a single canopy layer with an SDI of 345, indicating an over crowded condition. The diameter range is from 7 to 28 inches. The diameter distribution of the stand is skewed to the smaller classes, where 31% of the stems are between 8 and 10 inches in diameter, 51% of the stems are between 10 and 20 inches, and only 19% of the stand is over 20 inches in diameter. This stand has virtually no understory development.

The lack of understory development and crowding of trees into the smaller diameter classes are characteristics which are indicative of the stem exclusion stage of timber stand development (Oliver and Larson, 1996). Stem exclusion occurs when trees, which are of a single cohort, fully occupy the available growing space on the site, leaving insufficient resources for understory regeneration and growth (Oliver and Larson, 1996, Oliver et. al. 1998). This condition will continue until the stand begins to break apart due to instability or some disturbance reduces the stocking level, thereby breaking up the continuity of the canopy, freeing up resources and allowing light to

penetrate to the ground. Then the trees remaining in the canopy can resume growth, and understory re-initiation will commence (Oliver and Larson, 1996).

The site evaluation surveys combined with the above noted aerial surveys, indicate that while *PW* is present on this site, it's occurrence is located primarily within the riparian reserve areas and occasionally as scattered trees in the non-riparian upland forest. It is estimated that approximately 10 - 15% of the stand is infected with *PW* at this time. It is not expected that disease presence should limit treatment options in this unit.

The stand exams indicate that this unit has approximately 11.1 Douglas-fir snags per acre in the 14 inch diameter class. The coarse woody debris transect indicates that there is approximately 1825 lineal feet per acre of decay class 4 down wood ranging from 24 - 39 inches large end diameter. This wood is not NWFP regeneration harvest creditable due to the advanced stage of decomposition. The understory shrub layer in Unit 2 is not well developed, due to the density of the overstory. For the degree of understory shrub development that is present, the primary species include Salal, sword fern, dwarf Oregon grape, vine maple, and bracken fern. The herb layer is similar in composition to Unit 1, however, the herb layer development is not as great. As stated previously there are no official plant association guides available for the this area, there is however, a draft guide. The common plant association for this unit is the Douglas-fir/salal type (McCain and Garza, 1998). The area was surveyed for special status plants in the fall of 1998. During that survey two Survey & Manage fungal species were identified near Unit 2. Those species are *Omphalina ericetorum* (category 3 & 4) and *Cudonis monticola* (category 3), neither of which are found within the project area boundary (Project Record Document 9).

**Table 3.** Unit 2 summary information, estimated from the initial stand condition as modeled by the Atterbury Stand Exam and the Organon model.

Species	TPA <sup>1</sup>	QMD <sup>2</sup> (Inches)	BA/AC <sup>1</sup>	SDI <sup>3</sup>	RD <sup>4</sup>	Bd Ft/Ac <sup>1</sup> (Scribner)	Cubic Ft/Ac <sup>1</sup>
Douglas-fir	153	17	202	345	56	52,000	9000
Stand	153	17	202	345	56	52,000	9000

<sup>1</sup> Derived from Organon model; <sup>2</sup> Diameter of the tree of average basal area; <sup>3</sup> Reineke (1933); <sup>4</sup> Curtis (1982).

#### Riparian Reserve Stand Condition:

A qualitative assessment of the riparian forests adjacent to Unit 2 was conducted to augment the quantitative data from the stand exams. The riparian condition adjacent to East Fork Dairy Creek is similar to that described for Unit 1. There are several steep, un-named tributaries to Dairy Creek along the north and south sides of Unit 2. The riparian reserve stands to the south of Unit 2 are essentially the same as the matrix lands. The portion that is adjacent to the north boundary of Unit 2, is comprised of 86% Douglas-fir and 14% red alder and is summarized in Table 4. This stand is primarily comprised of a single canopy layer with an average crown closure of 72% and SDI of 356, which is overly crowded. The diameter range is from 7 to 26 inches. The diameter distribution of the stand is skewed to the smaller classes, where 48% of the stems are between 6 and 10 inches in diameter, 50% of the stems are between 10 and 20 inches, and only 2% of the stand is over 24 inches DBH. This stand has virtually no understory development which is consistent with the stem exclusion stage of stand development described above.

**Table 4.** Riparian reserve adjacent to the north boundary of Unit 2 summary information, estimated from the initial stand condition as described by the Atterbury Stand Exam.

Species	TPA <sup>1</sup>	QMD <sup>2</sup> (Inches)	BA/AC <sup>1</sup>	SDI <sup>3</sup>	RD <sup>4</sup>	Bd Ft/Ac <sup>1</sup> (Scribner)	Cubic Ft/Ac <sup>1</sup>
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Douglas-fir	198	14	208	336	56	42,000	7595
Red Alder	32	6	7	15	3	0	0
Stand	239	13	201	356	60	42,000	7595

<sup>1</sup> From Organon model; <sup>2</sup> Diameter of the tree of average basal area; <sup>3</sup> Reineke (1933); <sup>4</sup> Curtis (1982).

### Unit 3

#### Matrix Stand Condition:

Unit three is comprised of three BLM timber type classes. The classes are, in descending order of area, D3=1930, D2=1930, D3RA=1930, HC\_RA3=1930 and D2=1930/D2-1970. These type classes indicate moderate stocking of Douglas-fir, with some component of red alder. The TPCC classification is NP in the portion of the unit SW of the powerline and FNR1 in the portion NE of the powerline. A TPCC classification of NP indicates that there should be no site conditions that would be expected to limit treatment options. The FNR1 classification indicates that there may be a soil nutrient deficiency on the site. Site specific stand exams reveal that Unit 3 is similar to the upland forest portion of Unit 2. Unit 3 is comprised of 93% Douglas-fir with 7% red alder which is primarily found in the extreme south end of the unit. The unit is summarized in Table 5. The Douglas-fir component has a single canopy layer with an average crown closure of 83%. The diameter range is from 7 - 34 inches DBH with an average diameter of 17 inches. The diameter distribution is skewed to the smaller classes where 91% of the trees are below 22 inches in diameter. Only 8% are above 22 inches. The larger Douglas-fir are located along the edges of the ridge comprising the eastern boundary of the unit, and along the milder slopes in the Southern half of the unit. This slight variability is probably a result of the salvage logging and snag felling operations which were conducted in the area. Most of the alder is located in a contiguous block in the southern portion of the unit, on a south facing slope spanning the entire slope from ridge top into Dairy Creek. Additional pockets of alder are isolated in the SW corner of the unit.

Understory development is variable in this unit. Where the area is dominated by dense Douglas-fir, in the stem exclusion stage of stand development, there is virtually no understory development. In the Northern portion of the unit, where the FNR1 TPCC classification is found, there is some development of understory shrubs, primarily Salal and Oregon grape, but no conifer regeneration. The shrub development is likely due to a slightly more open canopy than the remainder of the unit, resulting from decreased growth rates and crown density. The lack of understory development and crowding of trees into the smaller diameter classes are characteristics which are indicative of the stem exclusion stage of stand development, which is described in the Unit 2 summary.

The site evaluation surveys combined with the above noted aerial surveys, indicate that PW is present in this unit. Occurrence of *PW* in the unit is scattered, with few disease centers. It is estimated that no more than approximately 7 - 10% of this unit is infected, which is considered light.

The stand exams indicate that this unit has few if any Douglas-fir snags, which can be attributed to the fire history of the area and snag felling. The coarse woody debris transect indicates that there is approximately 456 lineal feet of decay class 3 and 4 down wood and 152 lineal feet of decay class 2 down wood per acre. The decay class 2 wood in the 16-19 inch large end diameter class and is therefore not NWFP regeneration harvest creditable. The decay class 3 down wood ranges from 9-15 inches at the large end and the decay class 4 down wood is in the 40-43 inch large end diameter class. Neither decay class 3 or 4 down wood are NWFP regeneration harvest creditable, due to their advanced stage of decomposition. As previously stated, currently there are no official plant association guides encompassing the area in which this action is located. However, there is a "draft" plant association guide available which includes the Coast Range of the Salem District (McCain and Garza, 1998). The

common plant association classification for these treatment areas are the Western hemlock/Ocean spray-salal type. The area was surveyed for special status plants in the fall of 1998. During that survey one Survey & Manage fungal species was identified near the proposed Unit 3. That species is the *Cantharellus formosus* group (category 1 & 3) (Project Record Document 9).

**Table 5.** Unit 3 stand summary information, estimated from the initial stand condition as described by the Organon model using Atterbury Stand Exam Data.

Species	TPA <sup>1</sup>	QMD <sup>2</sup> (Inches)	BA/AC <sup>1</sup>	SDI <sup>3</sup>	RD <sup>4</sup>	Bd Ft/Ac <sup>1</sup> (Scribner)	Cubic Ft/Ac <sup>1</sup>
Douglas-fir	159	16	195	349	57	51,000	9000
Red Alder	13	14	16	22	4	4000	400
Stand Ave.	171	16	219	371	60	55,000	9400

<sup>1</sup> From Organon model; <sup>2</sup> Diameter of the tree of average basal area; <sup>3</sup> Reineke (1933); <sup>4</sup> Curtis (1982).

#### **Riparian Reserve Stand Condition:**

There is an unnamed, non-fish bearing tributary to Dairy Creek that bounds the west side of Unit 3 (Project Record Document 8). There is no difference between the riparian reserve stands and the matrix stands within the treatment unit.

#### **RECOMMENDED SILVICULTURAL TREATMENTS:**

##### **Regeneration Harvest:**

##### **Unit 1**

Due to the high levels of *PW* in Unit 1, thinning is not a consideration. This is due to the root instability and reduction in growth and yield associated with these high levels of *PW*. Therefore, to meet the objectives for matrix lands stated in the RMP and on page 1 of this document, the recommended treatment for Unit 1 is regeneration harvest. Regeneration harvest would allow the removal of the diseased trees, reduction of susceptible tree species on the site and reforestation of the site with non-susceptible tree species. This would help to restore this portion of the Matrix/GFMA land allocation to a more productive condition by reducing the presence of *PW* on the site through time.

The recommended regeneration harvest would have the following features:

- Retention of all merchantable-sized hardwoods.
- 20 reserve trees per acre would be retained on site following regeneration harvest which would include 6 wildlife trees, 2 trees for future snags and 12 trees intended to supply 240 lineal feet of coarse wood which would be felled within a 5 year period, beginning at the termination of the timber sale contract. The reserve trees would be the largest trees available in the unit. Some *PW* infected trees may be retained with the intent that they blow down, which would provide the input of large wood as well as help remove the infected root material from the soil.
- Site preparation would be accomplished by cutting all unmerchantable sized non-conifer vegetation, all *PW* susceptible understory species and logging debris larger than 4 inches in diameter and greater than 4 feet in length into chunks no greater than 4 feet long, to a height of 6 - 12 inches or less.
- Reforestation would be accomplished with a mixture of western redcedar, red alder and bigleaf maple. If areas are found which are free from the presence of *PW*, Douglas-fir, grand fir and western hemlock may be used for reforestation.
- Timber yield would be approximately 7,000 cubic feet (36,000 bd.ft) per acre.

##### **Future condition of Unit 1 following Regeneration Harvest:**

Following regeneration harvest site preparation would be accomplished through slashing of all logging slash, non-

merchantable hardwoods, and *PW* susceptible conifer species. Stump surveys would be conducted around the unit perimeter to establish the maximum extent of *PW* on the site. If it is determined to be feasible to plant a portion of the area with *PW* susceptible species, they may be included in the planting mix, however due to the observed extent of *PW* it is not expected that disease susceptible species would be planted. Primarily, reforestation would be accomplished using western redcedar, red alder and bigleaf maple, planted on a 9 by 9 spacing. This would result in a plantation density of 537 trees per acre. The plantation would be subject to regularly scheduled treatments, including plantation maintenance (manual brush control) or precommercial thinning. Treatment type and necessity would be determined during regularly scheduled regeneration stocking surveys.

Following a period of 50 to 60 years, maintaining site occupancy with non-*PW* susceptible species would provide sufficient time for the fungus to consume most of the available host material and die. At that time, the area may be considered for hardwood conversion and reforestation with species that are susceptible to *PW*.

#### **Future condition of Unit 1 without Regeneration Harvest:**

In the absence of treatment, the continued decline of this stand is expected. The overstory would continue to decline and *PW* would extend its presence into the surrounding less infected areas. This would lead to a further decline in the surrounding stands. By not removing the Douglas-fir, hemlock and grand fir, *PW* would continue to be maintained on the site in their roots and stems. Eventually, as the current overstory continues to decline, resident hardwoods and understory cedar would begin to occupy the dominant crown positions. Large amounts of coarse wood would be input to the system through the death of the susceptible conifers. This input may be beneficial for some wildlife species, it would also increase the potential for Douglas-fir beetle outbreaks. In addition, natural regeneration of shade tolerant species such as hemlock would probably establish on the down coarse wood and occupy the understory. The growth of western hemlock, which is susceptible to *PW*, would ensure a steady supply of host material for the *PW* fungus and would increase its longevity on the site. For Timber production purposes, an easily understandable measure of the impacts of *PW* is in lost wood volume production. Volume loss in heavily infested stands, such as the stand comprising Unit 1, can be as high as 70% (Thies and Sturrock, 1995). The ideal (uninfected) and expected future condition of the current heavily infested stand at the end of a 30 year growth simulation with Organon is presented for comparison in Table 6. The decrease in volume noted in Table 5 is for the currently existing stand of timber. These losses may be compounded in the future as disease centers continue to expand radially at the rate of 1 foot per year (Thies and Sturrock, 1995).

**Table 6.** Future condition represented with Douglas-fir cubic foot volume per acre in Unit 1 with no treatment, comparing ideal volume<sup>1</sup> with no influence of *PW*, and potential volume<sup>2</sup> reflecting decline resulting from high *PW* infection levels.

Species	Ideal Volume <sup>1</sup>	<i>PW</i> influenced potential volume <sup>2</sup>
Douglas-fir	13,951	9658
Total volume	13,951	9658

<sup>1</sup> From Organon; <sup>2</sup> Calculated from Organon, with 70% growth decline due to *PW* infection.

#### **Commercial Thinning:**

##### **Unit 2:**

Currently the matrix stand comprising Unit 2 is overstocked. This is evidenced by several indicators: 1. The initial stand SDI, as previously stated is 345. In coastal Douglas-fir the maximum SDI is 520 (Marshall, 1994), which means that the current SDI level of Unit 2 is 66% of maximum. Maximum tree vigor and stand growth occurs between SDI 182 and 312, which are 35% and 60% of maximum respectively (Marshall, 1994). Above 60% of maximum SDI, tree crowns recede, individual tree growth declines and competition related mortality (death of

suppressed trees) begins. The over stocked condition of the stand is further evidenced by; 2. There is little differentiation in heights or diameters in this stand. When a tree approaches a diameter to height ratio of 1% and below it becomes extremely unstable and prone to stem buckling (Oliver and Larson 1999). Stem instability resulting from low diameter to height ratios may also develop, but is not expected to be a problem in this unit where current ratios are approximately 1.3%.

### **Unit 3:**

Currently the matrix stand comprising Unit 3 is overstocked. The overstocked condition is indicated in several ways: 1. The average crown closure, as reported by the Atterbury Stand Exam, is 83%; 2. The initial stand level SDI, as stated in Table 5 is 371. As stated for Unit 2, in coastal Douglas-fir the maximum SDI is 520 (Marshall, 1994), which means that the current SDI level of Unit 3 is 71% of maximum. Stem instability resulting from low diameter to height ratios may also develop, but is not expected to be a problem in this unit where current ratios are approximately 1.4%.

### **Recommended Treatment:**

Due to the similarities of stand composition and to meet the objectives for matrix lands stated in the RMP and on page 1 of this document, the recommended treatment for Units 2 and 3 is commercial thinning. Commercial thinning would release the larger component of the stand from competition for available site resources and allow the residual trees to realize their maximum growth potential. The thinning treatment should be moderate, to reduce the potential for the spread of SNC into this stand.

The goal would best be met by applying a moderate thinning treatment of the co-dominant and intermediate crown classes in both units. The treatment would not be a strict “thinning from below,” because there is not a great deal of vertical structure in either stand. The treatment for Unit 2 would be based on tree spacing as described below. The treatment for Unit 3 would be based on basal area retention as described below. These treatments would result in similar residual stands, however the prescription would result in slightly different stand structures.

When areas dominated by alder are encountered, they would be thinned at a slightly wider spacing than the adjacent conifer stands. Using this approach for the alder, should allow them to maintain rapid diameter growth (Dave Hibbs, personal conversation).

### **Unit 2:**

The recommended thinning treatment in Unit 2 would have the following features, post treatment conditions are summarized in Table 7:

- a. Thinning would focus removal in the 8 to 22 inch diameter class. These trees comprise a single canopy layer which is overstocked and would most likely die due to competition related mortality.
- b. The trees per acre in Unit 2 would be reduced from the pretreatment level of 153 trees per acre to a residual count of approximately 91 trees per acre, a reduction of 62 trees per acre. This would result in a tree spacing of approximately 21 feet.
- c. Stand SDI would be reduced from the pretreatment level of 345 (66% of max.) to a residual level of approximately 241 (47% of max.).
- d. The target for basal area retention would reduce the pretreatment density of 202 sq.ft/ac to a post treatment level of approximately 167 sq.ft/ac, a 17% reduction.
- e. Where infection centers of *PW* are found, symptomatic trees would be removed with patch clear cuts. The resulting patches would be isolated from the residual stand using the “bridge tree cut” method, which is implemented by removing one perimeter tree beyond the last symptomatic tree in the infection center. The patches would be reforested with western redcedar or red alder.
- f. In areas where cable corridors converge, shade tolerant species such as western hemlock, western

redcedar, grand fir and/or bigleaf Maple would be planted, providing environmental conditions would allow sustained growth. If *PW* is present, grand fir and hemlock would not be planted.

- g. Upon completion of the recommended treatment the QMD would increase from a pretreatment size of 17 inches to a post treatment size of 18 inches.
- h. Timber Yield would be approximately 3593 cubic ft (20,000 bd ft) per acre.



**Table 7.** Unit 2 residual stand summary information at completion of Commercial thinning to 91 trees per acre at 60 years of age.

Species	TPA	QMD <sup>1</sup> (Inches)	BA/AC	SDI <sup>2</sup>	RD <sup>3</sup>	Bd Ft/Ac (Scribner)	Cubic Ft/Ac
Douglas-fir	91	18	167	241	339	40000	7000

<sup>1</sup> Diameter of the tree of average basal area; <sup>2</sup> Reineke (1933); <sup>3</sup> Curtis (1982).

#### Unit 3:

The recommended thinning treatment for Unit 3 would have the following features, post treatment conditions are summarized in Table 8:

- The thinning would focus removal in the 8 to 22 inch diameter class. These trees comprise a single canopy layer which is overstocked and would most likely die due to competition related mortality.
- Basal area in the unit would be reduced from the pretreatment level of 257 ft<sup>2</sup> per acre to a residual level of approximately 168 ft<sup>2</sup> per acre, a 34% reduction. Basal area retention marking would maintain the existing variation in stand density across the landscape of this unit.
- Stand SDI would be reduced from the pretreatment level of 383 (73% of max.) to a residual level of approximately 247 (47% of max.).
- Where infection centers of *PW* are found, symptomatic trees would be removed with patch clear cuts. The resulting patches would be isolated from the residual stand using the “bridge tree cut” method, which is implemented by removing one perimeter tree beyond the last symptomatic tree in the infection center. The patches would be reforested with western redcedar or red alder.
- In areas where cable corridors converge, shade tolerant species such as western hemlock, western redcedar, grand fir and/or bigleaf Maple would be planted, providing environmental conditions would allow sustained growth. If *PW* is encountered in these areas, no hemlock or grand fir would be planted.
- Upon completion of the recommended treatment the arithmetic mean DBH would remain at approximately 16 inches and the QMD would increase from a pretreatment size of 17 inches to a post treatment size of 18 inches.
- Timber Yield would be approximately 3593 cubic ft (20,000 bd ft) per acre.

**Table 8.** Unit 3 residual stand summary information at completion of moderate Commercial thinning to 168 ft<sup>2</sup> basal area per acre at 60 years of age, as described by the Organon Growth model.

Species	TPA <sup>1</sup>	QMD <sup>2</sup> (Inches)	BA/AC <sup>1</sup>	SDI <sup>3</sup>	RD <sup>4</sup>	Bd Ft/Ac <sup>1</sup> (Scribner)	Cubic Ft/Ac <sup>1</sup>
Douglas-fir	93	18	161	236	38	40,000	7000
Red Alder	7	14	7	11	2	2000	0
Stand Ave.	100	18	168	247	40	42000	7000

<sup>1</sup> From Organon model; <sup>2</sup> Diameter of the tree of average basal area; <sup>3</sup> Reineke (1933); <sup>4</sup> Curtis (1982).

#### Estimated Future Condition in Units 2 and 3, at 30 years, Following Treatment:

Following treatment Units 2 and 3 would be virtually identical, growing space and resource availability would increase for the residual stands. Residual tree crown volume would increase, which would be reflected in the maintenance or increased diameter growth rates of individual trees over a longer period of time. This expectation is illustrated in the results of growth simulation with the Organon model, which are presented in Table 9. The thinning would push the stand into the understory reinitiation stage of stand development by removing trees that

are expected to die over the next 30 years, allowing light to reach the forest floor.

The Organon model has a feature which makes conservative estimates of mortality due to suppression. The estimation indicates that 14 trees per acre would die due to intraspecific competition related suppression over the 30 year simulation period following treatment. Most of these trees (90%) would under 16 inches in diameter.

Shade tolerant tree species are expected to seed in naturally, and would supplement the trees which would be planted in cable convergence “wagon wheels.” The amount and composition of understory tree regeneration which would occur is unknown at this time, however it is expected. In the future, when this stand is again considered for treatment, the multi-level stand structure resulting from this treatment would allow a wide range of treatment options, any of which could satisfy a timber or wildlife management objective. Future treatment should not be considered until CMAI, which should occur at approximately stand age 90.

**Table 9.** Powerline Dairy Units 2 and 3 stand summary information at stand age class 90, following basal area thinning treatment, as projected by the Organon model. This table does not reflect the potential for understory regeneration following treatment.

Species	TPA <sup>1</sup>	QMD <sup>2</sup> (Inches)	BA/AC <sup>1</sup>	SDF <sup>3</sup>	RD <sup>4</sup>	Bd Ft/Ac <sup>1</sup> (Scribner)	Cubic Ft/Ac <sup>1</sup>
Douglas-fir	79	23	219	292	46	70,000	11,000
Red Alder	6.1	16	9	14	2	3000	0
Stand Ave.	85	22.7	229	306	49	73000	11,000

<sup>1</sup> From Organon model; <sup>2</sup> Diameter of the tree of average basal area; <sup>3</sup> Reineke (1933); <sup>4</sup> Curtis (1982).

#### **Estimated Future Condition of Units 2 and 3, 30 years from proposed treatment, Without Treatment:**

The condition of Unit 3, as projected by Organon, when it reaches the 90 year age class without treatment is summarized in Table 10. Without treatment individual tree growth is expected to decline as the stand density increases. Without treatment the stand would continue to become more crowded, and the codominant and intermediate trees would begin to decline. Trees currently occupying the lower-intermediate and suppressed canopy classifications would die due to suppression and stem buckling.

The mortality projection feature of the Organon model indicates that over the course of the 30 year simulation approximately 38 trees/acre would die due to intraspecific competition related suppression. The diameter distribution of the simulated mortality indicates that approximately 92% of these trees would be under 16 inches in diameter. While the level of CWD in the stand would be higher than the treated stand, the CWD would be from the smallest diameter classes in the stand. This small CWD would not contribute the necessary large wood and would not be long lived on the forest floor. In addition, the losses resulting from Douglas-fir beetle regeneration in the down wood may lead to increased losses, however, most of the dead trees would be below the threshold of 12 inches which is the minimum optimal size for successful beetle brood development. Eventually, the overstory would decline to a point where sufficient light would penetrate to the understory and begin the understory reinitiation stage of stand development (Oliver and Larson 1999), however it is not known how long that would take.

**Table 10.** Powerline Dairy Units 2 and 3 stand summary information at stand age class 90, with no treatment applied at age class 60, as projected by the Organon model.

Species	TPA <sup>1</sup>	QMD <sup>2</sup> (Inches)	BA/AC <sup>1</sup>	SDI <sup>3</sup>	RD <sup>4</sup>	Bd Ft/Ac <sup>1</sup> (Scribner)	Cubic Ft/Ac <sup>1</sup>
Douglas-fir	114	23	296	292	46	97,000	15,000
Red Alder	12	16	16	14	2	5000	500
Stand Ave.	126	21	312	424	49	100,000	15,000

<sup>1</sup> From Organon model; <sup>2</sup> Diameter of the tree of average basal area; <sup>3</sup> Reineke (1933); <sup>4</sup> Curtis (1982).

#### **Recommended Restrictions for both Matrix thinning units:**

**Logging Damage:** To reduce logging damage, do not conduct thinning operations during the period of bark slippage. This time period typically occurs between April 1 and July 15 of any one year.

**Skid Trails In Thinning Areas:** Do not subsoil skid trails in thinning areas. If subsoiling skid trails must occur for hydrological reasons, do not conduct operations between March 1 and August 1 of any one year. Conducting operations during this time may increase the chances for bark beetle attack and mortality of trees wounded during subsoiling operations.

**CWD retention:** A project feature may include retaining on site several of the larger reserve trees cut to facilitate yarding operations. By maintaining these trees on site the component of large CWD would be enhanced within the unit. If this wood is felled prior to the spring and summer flights (March-May, June-July) of the Douglas-fir beetle, the retention of this wood would provide breeding habitat and thus contribute to an increase in the presence of the Douglas-fir beetle, and may result in some loss of residual trees. Hostetler and Ross (1996) report that mortality of live trees greater than 12 inches in diameter may be as high as 60% of the number of infested down trees by the fourth year following their input. Therefore, to reduce losses to Douglas-fir bark beetles, disperse the CWD so that there are no large concentrations (3+ logs). If possible, time the input of CWD to occur during the months of August or September of any one year. Conducting input of CWD in August and September would insure that the yearly bark beetle flight season was complete and habitat suitability of the down wood for beetle development the following spring would be sub-optimal. This would decrease the potential for increased beetle populations resulting from our activities, and may reduce losses of residual trees to the Douglas-fir beetle.

**Other Considerations:** These soils are classified as the Tolany loam. This is a deep well drained soil formed from silty colluvium. The main limitations of this soil are susceptibility of the surface layer to compaction, the moderate to high hazard of water erosion, and plant competition (Smyth, 1986). If ground based logging equipment is used, it should be confined to pre-approved equipment/skid trails, and operations should be limited to times of low soil moisture. This soil is prone to displacement of the surface layers when it is dry and puddling when it is wet (Smyth, 1986). Mountain Beaver have been identified throughout the treatment area. This should be considered for reforestation efforts.

#### **Riparian Reserves:**

A watershed analysis for Dairy Creek was completed in February of 1999 that identifies the Dairy Creek system as lacking in large woody debris, and that it may be beneficial to conduct riparian treatments to help provide a future source for large wood debris. Currently the streams and low-slope riparian areas adjacent to the streams are developing well as described above. The upland riparian reserves adjacent to Units 1 and 3 are essentially the same as the adjacent stands of matrix/GFMA, and are expected to develop in the same fashion as described for each unit in the absence of treatment. The upland riparian reserve adjacent to Unit 2 is described above and is

very different from the adjacent matrix lands.

Due to the high level of *PW* in and adjacent to Unit 1, no upland Riparian thinning would be advisable. Blow down is likely to occur following completion of the regeneration harvest treatment. Due to the current condition thinning may enhance the blow down potential by removing any support adjacent trees may be providing each other. In addition, the level of *PW* infection may lead to thinning of healthy trees and retention of trees with *PW*, because crown symptoms are not always readily visible.

Units 2 and 3 may be considered for regeneration harvest when CMAI is reached. This would be expected to result in large amounts of blow down within the riparian reserves if the currently overstocked condition is maintained and stem stability continues to degrade. Therefore, it would be beneficial to treat the riparian reserve stands at this time to help establish windfirmness. This would increase the quality of the riparian reserve stand habitat by creating some larger trees, as well as insure that these stands can withstand the increased wind velocities they are likely to experience when the adjacent stands are regenerated. The highest wind hazard area for potential blowdown following regeneration harvest is typically on mid-slopes on the windward side of ridges within unit boundaries. This is because the trees are not well buttressed against the turbulence resulting from storm winds, which typically come from the opposite direction as the prevailing winds (Dale Thornburg, Silviculture course lecture). For example, generally a prevailing wind from the northwest is countered by a storm wind from the southeast. Therefore, while some blow down may occur on the east side of the unit, the highest hazard for large amounts of blow down would be located along the Northwest and west edges of the treatment unit.

#### **Unit 2 Riparian Reserves:**

The objective of the action in the riparian stands along the north and west boundary of Unit 2 is the enhancement of wind firmness. The differences between the matrix stands and the upland riparian reserves would require that different treatments be implemented to accomplish the objective.

This goal would best be met by applying a light commercial thinning to these riparian reserve stands. A light thinning would reduce competition on the site by reducing the numbers of trees on the site. A light thinning would provide the space needed for the residual stand to increase its canopy size and root system stability, thereby increasing individual tree growth and wind firmness. A light thinning would also maintain sufficient numbers of trees on the site to reduce the potential for stem buckling and windthrow.

The treatment would be accomplished by reducing the stocking level of trees in the co-dominant canopy layer. The treatment would focus on this canopy layer because there is no real opportunity to “thin from below” due to the current lack of vertical structure in the stand. Increased individual tree growth resulting from this treatment would allow some trees to express dominance over others, enhancing the development of vertical structure in the stand as well. This treatment is not expected to modify the current diameter distribution however, because the current condition is so undifferentiated. Post treatment conditions are summarized in Table 11.

Currently, CWD is lacking in these riparian stands. Felling and maintaining all of the trees cut to accomplish the treatment objective would enhance CWD. However, if all the trees which are cut (79 TPA) were retained on site, losses of residual trees to the Douglas-fir beetle would most likely be quite significant. The creation of snags within the riparian reserves would be beneficial to achieving long term riparian objectives. The expected losses would not be limited to the riparian reserves however, but would also occur within the adjacent matrix stands. If the riparian areas are treated it would be recommended to maintain *PW* centers within them. If small numbers of logs are retained in the riparian areas as well, Douglas-fir beetles hatching from these logs would likely be attracted to the stressed trees within the *PW* centers as well as those trees immediately adjacent to the hatch site and not venture out into the matrix lands in large numbers. In the riparian areas, reserve trees cut to facilitate cable logging could be used to enhance CWD. These logs would provide Douglas-fir beetle habitat, but losses should be limited

to riparian reserve areas.

The recommended riparian reserve thinning treatment would have the following features:

- a. The thinning would focus in the 8 to 20 inch diameter class. These trees are of a single canopy, which is overstocked and would most likely die due to suppression related mortality.
- b. Stand SDI would be reduced from the pretreatment level of 356 (68% of max.) to a residual level of approximately 229 (44% of max.).
- c. Trees per acre would be reduced from the pretreatment density of 231 TPA to a residual density of approximately 152 TPA, a 40% reduction.
- d. Basal area would be reduced from the pretreatment level of 216 ft<sup>2</sup> per acre to a residual level of approximately 138 ft<sup>2</sup> per acre, a 36% reduction.
- e. Due to the uniform structure of the existing stand, the recommended treatment would not change the QMD, which would remain at 13 inches.
- f. If *PW* infection centers are encountered, they would be maintained in their existing form.
- g. All trees reserve trees cut to facilitate yarding would be retained on site to augment CWD within the riparian areas.

**Table 11.** Unit 2 stand summary information upon completion of Commercial thinning to an SDI of 229 at 60 years of age as described by the Organon Growth model.

Species	TPA <sup>1</sup>	QMD <sup>2</sup> (Inches)	BA/AC <sup>1</sup>	SDI <sup>3</sup>	RD <sup>4</sup>	Bd Ft/Ac <sup>1</sup> (Scribner)	Cubic Ft/Ac <sup>1</sup>
Douglas-fir	121	14	131	209	35	27,000	4782
Red Alder	32	6	7	15	3	0	0
Stand Ave.	153	13	138	229	38	27,000	4782

<sup>1</sup> From Organon model; <sup>2</sup> Diameter of the tree of average basal area; <sup>3</sup> Reineke (1933); <sup>4</sup> Curtis (1982).

#### **Expected future condition in the riparian reserve stands adjacent to Unit 2, after 30 years following treatment**

Following treatment light levels are expected to increase in the residual stand crowns, as well as at the ground surface. In response to the increased light, it is expected that crown volume would increase. The increase of leaf surface within the crown would result in an increase in individual tree diameter and root system growth. This expectation is reflected in the modeling results from Organon which are presented in Table 12. In the future, when the adjacent matrix stands are considered for treatment, the increased stability resulting from this thinning treatment would reduce the potential for windthrow in the riparian reserves.

The Organon model has a feature which makes conservative estimates of mortality due to suppression. The estimation for Unit 2 indicates that approximately 19 trees per acre would die due to intraspecific competition related suppression over the 30 year simulation period following treatment. Most of these trees (94%) would under 16 inches in diameter. Additional snags would be expected to result from the Douglas-fir beetle.

**Table 12.** Riparian reserve stand condition adjacent to Unit 2 stand summary information at stand age class 90, following treatment, as projected by the Organon model.

Species	TPA <sup>1</sup>	QMD <sup>2</sup> (Inches)	BA/AC <sup>1</sup>	SDI <sup>3</sup>	RD <sup>4</sup>	Bd Ft/Ac <sup>1</sup> (Scribner)	Cubic Ft/Ac <sup>1</sup>
Douglas-fir	107	18	196	283	46	54,000	9,000
Red Alder	27	9	12	22	4	500	200
Stand Ave.	134	17	207.6	310	51	54,500	9,200

<sup>1</sup> From Organon model; <sup>2</sup> Diameter of the tree of average basal area; <sup>3</sup> Reineke (1933); <sup>4</sup> Curtis (1982).

**Expected Future Condition in the Riparian Reserve stands adjacent to Unit 2, 30 years from proposed treatment, Without Treatment:**

The condition of the stand, as projected by Organon, when it reaches the 90 year age class without treatment is summarized in Table 13. Without treatment the stand would continue to become more crowded, diameter to height ratios would continue to decline and root system instability would increase. Without treatment light levels would further decrease as the stand density increases and competition related mortality would continue. The decline in stem and root stability resulting from decreased crown size would further contribute to mortality from stem buckling and windthrow.

The Organon mortality projection feature indicates that over the course of the 30 year simulation in Unit 2, approximately 48 trees/acre would die due to intraspecific competition related suppression. The diameter distribution of the simulated mortality indicates that approximately 95% of these trees would be under 16 inches in diameter. While the level of CWD in the stand would be higher than the treated stand, the CWD would be from the smallest diameter classes in the stand. This small CWD would not contribute the necessary large wood and would not be long lived on the forest floor. In addition, the losses resulting from Douglas-fir beetle regeneration in the down wood may lead to increased losses of standing trees, however, most of the dead trees would be below the threshold of 12 inches which is believed to be the minimum optimal size for beetle brood development. Eventually, the overstory would decline to a point where sufficient light would penetrate to the understory and begin the understory reinitiation stage of stand development (Oliver and Larson 1999), however it is not known how long that would take.

**Table 13.** Powerline Dairy Riparian Reserve stands adjacent to Unit 2 summary information at stand age class 90, without treatment, as projected by the Organon model.

Species	TPA <sup>1</sup>	QMD <sup>2</sup> (Inches)	BA/AC <sup>1</sup>	SDI <sup>3</sup>	RD <sup>4</sup>	Bd Ft/Ac <sup>1</sup> (Scribner)	Cubic Ft/Ac <sup>1</sup>
Douglas-fir	155	17	271.6	395.7	64.2	76,000	13,000
Red Alder	26.8	8	9.5	22	4	400	100
Stand Ave.	134	16	281	420	69	81,000	13,000

<sup>1</sup> From Organon model; <sup>2</sup> Diameter of the tree of average basal area; <sup>3</sup> Reineke (1933); <sup>4</sup> Curtis (1982).

**Unit 3 Riparian**

Among the objective of the action in Unit 3 is enhancement of wind firmness and maintenance of variable stand density across the landscape. To retain the current variation in stand density the upland RR along the high wind hazard west boundary, a basal area retention thinning would be implemented. Since the riparian reserve stands adjacent to Unit 3 are essentially the same as the matrix stands, the recommendation is to treat the riparian reserves

in the same fashion as the matrix. The thinning treatment would increase wind firmness, by providing increased light, allowing the deepening of residual tree crowns and increased diameter and root growth. Where *PW* infection centers are encountered within the riparian areas, they would be maintained on the landscape. Stand development, both with and without treatment is expected to be similar to that described for Unit 3.

### **Literature Cited**

- Hadfield, James S., D. Goheen, G. Filip, C. Schmitt and R. Harvey. 1986. Root Diseases in Oregon and Washington Conifers. United States Forest Service PNR.
- McCain, Cindy and S. Garza. 1998. Interim Report on the Plant Association Classification and Modeling Project: Report on 1997 field season results. USFS Area 6 Ecology Program.
- Marshall, David D. 1994. Density Management Methodology Applied to Commercial Thinning. Unpublished training materials, Department of Forest Resources, Oregon State University.
- Oliver, Chadwick D., A. Osawa, and A. Camp, 1998. Forest Dynamics and resulting Animal and Plant Population Changes at the Stand and Landscape Levels. Journal of Sustainable Forestry, Vol. 6(3/4).
- Oliver, Chadwick D. and B. C. Larson, 1996. Forest Stand Dynamics. John Wiley and Sons, Inc. 520 p.
- Partridge, Arthur and C. Bertagnolli Unpublished. Disease and Insect Problems of Western Trees. Copyright by TREAZ, Trees From A to Z, Inc. Moscow, Idaho.
- Smyth, Richard T. 1986. Soil Survey of Columbia County, Oregon. United States Department of Agriculture Soil Conservation Service.
- Thies, Walter G., and R. N. Sturrock. 1995. Laminated Root Rot in Western North America. United States Forest Service Resource Bulletin PNW-GTR-349.
- USDA FS No Date. Forest Disease Management notes. Armillaria root disease.

## APPENDIX 3

### BIOLOGICAL EVALUATION

Wildlife Resources

Powerline Dairy Timber Sale

USDI BLM, Salem District, Tillamook Resource Area

Prepared by: Steve Bahe, Wildlife Biologist  
Project Location: T4N., R3W., section 33 W.M.  
Date: February 15, 2000

### AFFECTED ENVIRONMENT

**Watershed Scale:** The Dairy-McKay watershed is strongly dominated by fragmented, early seral stage habitats which are primarily located on intensively managed industrial forest lands. As a consequence of patches of younger, small conifers and larger aggregated clearcuts being distributed across the landscape, the area is permeated with high contrast edges and contains little interior forest habitat. Many forested riparian corridors have been harvested or reduced to thin strips of red alder.

In general, past and present actions have resulted in little or no habitat within the watershed for those species dependent upon later-seral stage habitat including snags or other coarse woody debris, large blocks of interior forested habitat or cool, shaded, riparian habitats. Conversely, there is a great deal of habitat for those species which depend upon or utilize earlier-seral stage habitats, smaller patches and the juxtaposition of differing habitat types. Overall, the in-stream habitat conditions within the watershed are poor. For more detail of the condition of the Dairy-McKay watershed relative to wildlife, see the *Dairy-McKay Watershed Analysis* (1999).

**Project Area Scale:** The proposed action would occur primarily on lands allocated as GFMA/Matrix although up to approximately 16 acres of thinning would occur within the Riparian Reserve land allocation. The project area is not within designated spotted owl or marbled murrelet critical habitat.

The proposed Powerline Dairy Project is forested primarily with timber which is approximately 55- to 60-years-old and chiefly consisting of Douglas-fir, although some red alder is also present in various sized patches and single scattered trees. In addition, limited amounts of western redcedar as well as scattered uncommon components of cherry, grand fir and western hemlock are also present. The stand is fairly homogenous in tree size and stand structure.

The proposed project, is located within three treatment units which are located on ridge top and mid to upper slope locations; elevations of the proposed treatment units range from 1300 to 1700 feet. Units 1 and 2 are separated from unit 3 by the main stem of the East Fork of Dairy Creek and some additional "reserve timber," while units 1 and 2 are separated by several smaller intermittent and/or permanent streams and their associated Riparian Reserves.

Coarse Woody Debris (CWD), including snags and downed logs, is generally lacking within the treatment area although some portions of the stand, especially root rot pockets, contain an appreciable CWD component. CWD within these pockets is generally smaller logs of a decay class 1 or 2, and



snags which generally not expected to persist over time. In addition, larger decay class 4, “legacy logs” are scattered throughout portions of the proposed units. Stand exams conducted within the treatment area indicate that there are no snags within the treatment areas although a small number of scattered, small snags were noted on a field exam of the area.

No special habitats (i.e. talus, cliffs, caves) have been located within or near any of the proposed units.

Table 1. lists those Bureau Special Status Species, S&M and Federally listed wildlife species which are potentially located within the proposed action area.

### **Wildlife Species listed or proposed under the Endangered Species Act:**

#### **INVERTEBRATES:**

##### **Oregon silverspot butterfly - (FT)**

Based on the fact that no suitable nor critical habitat for Oregon silverspot butterfly is present within the project area and there are no effects upon this species, it will receive no further discussion or analysis.

##### **Fender’s blue butterfly - Federally Endangered - (FE)**

Based on the fact that no suitable habitat nor critical habitat for Fender’s blue butterfly is present within the project area and there are no effects upon this species, it will receive no further discussion or analysis.

#### **BIRDS:**

##### **Northern Spotted Owl - Federally Threatened (FT)**

The proposed action would not occur within designated spotted owl critical habitat. There are no known occupied sites or 100 acre core areas as identified within the NFP within the vicinity of the project area. The nearest known owl sites, which are historical in nature, are several miles away. The nearest suitable spotted owl habitat is approximately 1.5 miles from the proposed action.

The project area currently is considered spotted owl dispersal habitat, but primarily as a function of the stand’s age and lack of vital habitat characteristic including structural diversity, it is not considered to be suitable foraging, roosting, and nesting habitat.

The majority of forest land in that portion of the state which includes the project area is privately owned and is managed for timber production in such a way as to preclude the development of suitable owl habitat. Of the forest lands within the watershed which include all ownerships, roughly 7% is considered suitable habitat (based only on a stand age of over 80 years old) while a total of approximately 54% (including the 7% suitable) is of an age and condition to function as dispersal habitat. Approximately 82% of the BLM land within the watershed is in a condition to function as dispersal habitat. The federal lands in the watershed are distributed in a scattered, checkerboard fashion and do not lend themselves to the management of larger blocks of suitable habitat for a wide-ranging species such as the spotted owl. Federal lands within the Matrix land allocation are generally intended to be

managed with a high emphasis on timber production with rotation lengths that would also preclude the development and/or maintenance of suitable spotted owl habitat.

It is not known if the spotted owl is currently using the area because of the lack of current survey data, however it would not be expected based on the lack of suitable habitat within the area. The area of the proposed Powerline Dairy Project was surveyed for spotted owls from 1991-1993 primarily in support of the proposed Coney Road Timber Sale; no spotted owls were detected during those surveys. In 1994 a spotted owl was detected approximately five miles to the north of the proposed project area; it was not relocated on follow-up visits.

**Marbled Murrelet** - (FT)

The project area is approximately 43 miles from the ocean. It is not located within or near designated marbled murrelet critical habitat. There is no marbled murrelet habitat in the proposed action area nor within 0.25 miles. With the nearest known murrelet site being more than 20 miles to the northwest, there are no known occupied murrelet sites (nor unmapped LSRs as per the NFP) within the vicinity of the proposed project area.

**Bald Eagle** - (FT)

No eagle sightings have been recorded within or near the proposed treatment area and none would be expected based on the lack of suitable roosting, foraging or nesting habitat. The nearest known bald eagle nest is approximately 4.5 miles southeast of the proposed action.

**Aleutian Canada Goose** - (FT)

Based on the fact that no suitable habitat nor critical habitat for the Aleutian Canada goose is present within the project area and there are no effects upon this species, it will receive no further discussion or analysis.

**MAMMALS:**

**Columbia White-tailed Deer** - (FE)

The Columbia white-tailed deer once ranged throughout the river valleys west of the Cascade Mountains from the Umpqua River in Oregon northward through the Willamette Valley to Puget Sound and along the lower Columbia River from Astoria to The Dalles. They are now generally restricted to Oregon white-oak and mixed woodlands along the Umpqua River near Roseburg Oregon, and along the lower Columbia River near Cathamet, Washington and Westport, Oregon. The Columbia River population is strongly tied to riparian habitats which are located in an area approximately 25 miles north-northwest of the Powerline Dairy Project area. They generally utilize pastures and brushy woodlots associated with tidal lowlands that are characterized by cottonwood, willow, alder, spruce and dogwood.

On September 16, 1999 two Tillamook Resource Area Natural Resource Specialists reported seeing what they both believe was a yearling doe, white-tailed deer. The deer was located in a private clearcut approximately 500 feet east of the Powerline Dairy unit 33-1 in section 34 of T4N., R3W.. There have been no other known unconfirmed or confirmed white-tailed deer sightings within the vicinity of the proposed action.

## **Survey and Manage Wildlife Species (S&M) :**

### **Red Tree Vole**

The Record of Decision for the Northwest Forest Plan identifies one vertebrate Survey and Manage species that may occur in the area of the Powerline Dairy Project. This species is the red tree vole. Although the red tree vole is more generally associated with larger and older Douglas-fir trees than those found in the vicinity of the proposed action, the project area currently contains potential habitat for the red tree vole.

The project area was surveyed to protocol for red tree voles during September 1999. These surveys resulted in no red tree voles or red tree vole nests being located.

### **Mollusks**

There are several Survey and Manage invertebrate species (mollusks) with potential of being located within the proposed treatment units and/or in the general sale area (see table 1). In general, these species are associated with the organic duff layer on the forest floor as well as with habitat types containing CWD, sword ferns and a hardwood component, especially big-leafed maple.

Survey and Manage mollusk surveys for Powerline Dairy Project were conducted from April 24<sup>th</sup> to June 18<sup>th</sup> 1998; October 14<sup>th</sup> to November 5<sup>th</sup> 1998; and May 13<sup>th</sup> and 14<sup>th</sup> 1999. "Survey Protocol for Terrestrial Mollusk Species from the Northwest Forest Plan" (Draft Version 2.0, Oct. 29, 1997) was followed for all surveys. These surveys resulted in the detection of no Survey and Manage mollusk species. However, a mushroom collected in September of 1999 from within the western portion of the proposed unit 33-2 was discovered to have a mollusk adhering to it. This animal was confirmed to be a papillose tail-dropper (*Prophysaon dubium*) a Survey and Manage species - (category 1 & 2).

The papillose tail-dropper appears to be strongly associated with hardwood logs and leaf litter as well as the fruiting bodies of some fungal species and habitats within rockslides. The newly discovered papillose tail-dropped site is situated in the uplands (within the Matrix land allocation) on a dryer, south facing slope, approximately 200 feet from an existing clearcut edge located west of the proposed unit. The site is primarily forested with Douglas firs although scattered red alder are also present. The understory vegetation at the known site includes vine maple, salal, Oregon grape, red huckleberry, sword fern and bracken fern. Several large, decay class 4 fir logs are located in proximity to the known site.

As a result of this discovery and to protect this known site, a "Habitat Area" was established as per *Management Recommendations for Terrestrial Mollusk Species - Prophysaon coeruleum, Blue-Gray Taildropper & Prophysaon dubium, Papillose Taildropper version 2.0* (November 1999). This mollusk Habitat Area was dropped from the proposed unit.

From the actual point where the slug was discovered, the Habitat Area has been configured to extend west approximately 200 feet to the BLM property line and clearcut edge; south, down the slope to the Riparian Reserve boundary; east approximately 150 feet to where thinning within unit 33-2 would occur, and north approximately 100 feet to within approximately 150 feet of the proposed road which will access the unit. This configuration is believed to be adequate to provide protection to the site and maintain the site's current micro-climate especially given the facts that the current proposed action is a light thinning

and the adjacency of the extensive Riparian Reserve network to the south of the Habitat Area which is not proposed for treatment at this time. Inclusion of the portion of the Habitat Area which extends west of the known site to the clearcut edge should help ameliorate any effects which the existing private clearcut could have on the temperature or humidity of the site, especially during east wind patterns in the summer or fall. Maintenance of the current canopy closure within the Habitat Area, especially in that portion of the Habitat Area south of the known site, would help provide protection to the site's current conditions through maintaining a well shaded forest floor in and adjacent to the known site and assuring a continued supply of leaf litter and CWD to the forest floor.

### **Other Special Status Species:**

#### **Amphibians:**

##### **Spotted Frog** - Bureau Sensitive (BS)

The spotted frog is Oregon's most aquatic indigenous frog and is nearly always found in or near a perennial water body such as a spring, pond, lake, or slow moving stream. It is most often associated with non-woody wetland plant communities (sedges, rushes, and grasses). Historically, the spotted frog was thought to be found in the vicinity of the proposed project where suitable habitat was present however, the spotted frog is not expected to be currently found in or around the project area. Over the past 50 years, the spotted frog has experienced a dramatic reduction in range in western Oregon. The causes of the decline of the spotted frog are not fully understood but the destruction and degradation of wetlands and the introduction of bullfrogs and nonnative fish species into the frog's habitat are believed to have had disastrous effects on spotted frog populations.

##### **Clouded Salamander** - Bureau Tracking (BT)

The clouded salamander is strongly associated with decaying snags and CWD and may be found under the closed canopy, along forest edges, or in small forest openings. Although clouded salamanders have been known to use smaller sized down wood with the bark intact, the bulk of the project area is currently considered to be poor to fair clouded salamander habitat based on the limited quantity of CWD and snags within the area. However, localized portions of the project area, primarily centered around *P. weirrii* pockets within unit 33-1, probably afford good habitat for the clouded salamander and this species is probably utilizing such habitats found within and near the proposed project site.

##### **Red-Legged Frog** - (BT)

Although red-legged frogs have not been observed in the area, there are some riparian areas adjacent to the proposed project area that contain permanent water and could function as red-legged frog breeding areas. The well-shaded uplands provide good habitat for non-breeding and dispersing frogs.

##### **Cope's Giant Salamander** - Bureau Assessment (BA)

Cope's Giant Salamander is one of the most recently described vertebrates in the Pacific Northwest. This salamander is most commonly known in the aquatic larval and neotenic forms; Terrestrial adults are extremely rare with only three individuals known from the wild. These salamanders most commonly inhabit fast flowing creeks and streams and may also be found in seeps. Cope's Giant Salamanders are nocturnal and emerge from their diurnal hiding places and crawl about the rocky stream bottom or in the moist splash zone along the banks of streams.

Although this species has not been observed within the vicinity of the proposed action, streams within the project area afford suitable habitat.

## **Birds:**

### **Peregrine Falcon** - (BS)

The peregrine falcon was officially delisted from the ESA species list, effective 8/25/99; It is now treated as “Bureau Sensitive” under the Bureau’s Special Status Species Policy. There have been no peregrine falcon sightings recorded in the area of the proposed action; the habitat within and around the proposed action is not suitable for falcon nesting.

### **Northern Goshawk** - (BS)

Goshawks are generally associated with older conifer stand types with closed canopies, but have also been seen in younger seral and mixed stands. Goshawks are extremely rare in the Coast Range, and though thought to be possible, they have not been documented as breeding in the Northern Oregon Coast Range. Although goshawks have not been observed in the vicinity of the project area, migrating and dispersing birds could periodically be using the area.

### **Pileated Woodpecker** - (BT)

Pileated woodpeckers are dependant on some components of older forest such as large snags for drumming, roosting, nesting, and foraging and a supply of coarse woody debris for foraging. These woodpeckers are often found foraging in young stands or clearcuts but only if there are large down logs, stumps and/or snags present. Although marginal in quality based upon the general lack of trees and/or snags large enough for nesting, the habitat in and around the proposed action site is considered to be adequate for the needs of this species.

### **Western Bluebird** - (BT)

The western bluebird is a cavity nesting species which inhabits open areas containing scattered trees or snags suitable for nesting. There are some open areas (clearcuts) adjacent to the proposed project area on private land which could serve as suitable habitat for the western bluebird and it is presumably being used, although the general lack of suitable nesting structures within these areas most likely limits the quality of the habitat.

### **Lewis’ Woodpecker** - (BS)

Lewis’ woodpecker is a species of pine and other forests, woodland edges, streamside trees, and recent clearcuts and burns. This species feeds mainly on insects, mostly caught in the air, and also eats fruit, acorns, and other nuts. Lewis’ woodpecker once bred in the Tillamook burn but since the mid-1960's this species has suffered a drastic decline in numbers and has been extirpated as a summer resident in many areas such as along the coast and the Willamette Valley, where formerly it was common. The decline is likely related to the establishment and increasing abundance of the European starling, which competes effectively for nesting cavities, and the destruction of lowland oak habitats in the interior valleys of western Oregon. The last breeding record known for the northern Willamette Valley was near Scappoose, Columbia Co. in 1977. There have been no known recent sightings of Lewis’ woodpeckers within the area of the proposed action, and it is unlikely to be found in or around the Powerline Dairy Project.

## **Mammals:**

### **Bats**

In addition to the red tree vole which is a Survey & Manage Species, the NFP (Northwest Forest Plan) identifies five species of bats which would benefit from additional habitat protection. Four of these five species have potential of being located within or near the proposed action. These species include the fringed myotis, long-eared myotis, long-legged myotis, and the silver-haired bat. All of these bat species are known to inhabit immature coniferous forest and may forage near riparian areas, open areas, and along forest edges while utilizing large hollow trees for roosting, hibernating, and maternity colonies.

There are no known bat roosting or hibernaculum sites within the project area. Surveys for these species are required under the NFP if caves, mines, or abandoned wooded bridges and buildings are within or near the project area; since there are none, no bat surveys will be conducted within the project area.

### **Western Big-Eared Bat - (BS)**

In addition to the bat species identified within the NFP, one species of bat, the western big-eared bat, is covered by the Bureau's Special Status Species Policy. Western big-eared bats are seldom abundant but are known to occupy a variety of habitats. These bats are most typically associated with pine forests but are characteristic dwellers of caves, abandoned mines, and buildings. No such structures are found in the vicinity of the proposed action. It is unlikely this species of bat would be encountered in or near the proposed project.

### **Pine Marten - (BT)**

Historically the pine marten certainly inhabited the area of the proposed action but it is very unlikely that martens are currently using the proposed project area; martens have not been observed within the vicinity of the proposed action. It is believed that stands in and near the project area generally contain unsuitable or poor marten habitat. This is based upon the fragmented, disturbed nature of the surrounding landscape and the fact that large CWD, an important component of the pine martens habitat, is generally not abundant.

### **White-Footed Vole (BT)**

The white-footed vole is an uncommon burrowing rodent that is not well understood. The available literature reports that these burrowing voles use a variety of habitats, but are most closely tied to riparian alder/small stream habitats, with some researchers suggesting the presence of a mature overstory and/or an understory of "salmonberry thickets", or sword fern, moss, and thick vine maple. The area of the proposed project affords some such habitats and it is possible that white-footed voles are using such areas.

### **Other Species of Concern**

#### **Roosevelt Elk and Black-tailed deer**

Roosevelt elk and black-tailed deer use a wide range of habitat types and use of the proposed sale area by these species is considered moderate. The quality of the habitat for these species in the sale area is considered to be good. This is based on the fact that areas affording hiding cover are adjacent to, and interspersed with, areas seeded for forage and/or containing adequate browse.

## ENVIRONMENTAL CONSEQUENCES

### ALTERNATIVE 1 - (The “No Action” Alternative)

Under this alternative no forest management activities would occur within the proposed project areas at this time and forest stand would continue to grow and develop without management intervention. Under the “No Action” Alternative, the identified impacts of the proposed action would not occur at this site. Another project area would be selected to replace the proposed project and PSQ volume, potentially resulting in impacts of a similar nature at a different location.

Selection of the “No Action” Alternative would be of *NO EFFECT* upon the marbled murrelet, spotted owl, bald eagle and all other species listed under the ESA. In addition, it would not be expected to negatively impact (result in a trend toward federal listing or loss in population viability) any of the wildlife S&M, Special Status, or Species of Concern discussed above.

### ALTERNATIVE 2 - (The Proposed Action)

#### **Species listed or proposed under the Endangered Species Act:**

##### **Northern Spotted Owl** - (FT)

The project area currently is considered spotted owl dispersal habitat, but primarily as a function of the stand’s age and lack of vital habitat characteristic, it is not considered to be suitable foraging, roosting, and nesting habitat. While small openings, patch-cuts, roads clearings and landings may result in isolated portions of the thinning treatment areas having a post-treatment canopy closure of less than 40%, the portion of the project area being proposed for thinning as a whole is not expected to be removed from a condition to function as spotted owl dispersal habitat. The proposed thinning is expected to result in increased or maintained growth rates of the understory shrub species and the trees retained within the overstory. This would result in the development of some features of spotted owl suitable habitat earlier than would occur without treatment. These benefits associated with the thinning would be expected to be longer-lived/greater within the Riparian Reserve land allocation based upon the likelihood of the future regeneration treatments to occur within the Matrix land allocation.

The proposed regeneration harvest within unit 33-1 is expected to remove approximately 22 acres of spotted owl dispersal habitat. With approximately 54% of the forest lands (all ownership) and approximately 82% of the BLM land within the watershed being in a condition to function as dispersal habitat, it has been determined that adequate dispersal habitat is present to facilitate owl dispersal.

Though the majority of dispersal habitat within the watershed occurs on federal land, and its modification and removal *MAY AFFECT* the spotted owl by impacting its ability to disperse, it is *NOT LIKELY TO ADVERSELY AFFECT* the continued existence of the spotted owl based upon the fact that adequate dispersal habitat is present within the watershed.

In accordance with regulations pursuant to Section 7 of the Endangered Species Act of 1973, as amended, consultation with the USFWS concerning the potential impacts of the Powerline Dairy Project upon the

spotted owl has been completed. This project was included within the Programmatic Consultation conducted with USFWS on FY2000 Habitat Modification Projects (USFWS Biological Opinion 1-7-99-F-476). Alternative 2 is consistent with the Terms and Conditions contained within the Biological Opinion.

**Marbled Murrelet** - (FT)

The project area is not located in or near murrelet designated critical habitat. There is no suitable marbled murrelet habitat in the proposed action area or within 0.25 miles. With the nearest known site being located more than 20 miles to the northwest, there are no known occupied murrelet sites within the vicinity of the proposed project area. The proposed project would have *NO EFFECT* upon the marbled murrelet nor its designated critical habitat.

**Bald Eagle** - (FT)

No eagle sightings have been recorded within or near the proposed treatment area and none would be expected based on the lack of suitable roosting, foraging or nesting habitat. The proposed action would have *NO EFFECT* upon the bald eagle.

**Columbia White-tailed Deer** - (FE)

The Columbia white-tailed deer once ranged throughout the river valleys west of the Cascade Mountains from the Umpqua River in Oregon northward through the Willamette Valley to Puget Sound and along the lower Columbia River from Astoria to The Dalles. They are now generally restricted to the Oregon white-oak woodlands along the Umpqua River near Roseburg Oregon, and along the lower Columbia River near Cathlamet, Washington and Westport, Oregon. The Columbia River population is strongly tied to riparian habitats located in an area approximately 25 miles north-northwest of the Powerline Dairy Project area. They generally utilize pastures and brushy woodlots associated with tidal lowlands which are characterized by cottonwood, willow, alder, spruce and dogwood.

On September 16, 1999 two Tillamook Resource Area Natural Resource Specialists reported seeing what they both believe was a yearling doe, white-tailed deer. The deer was located in a private clearcut approximately 500 feet east of the Powerline Dairy unit 33-1 in section 34 of T4N., R3W.. Subsequent searches of the area resulted in no additional sightings.

According to Tom Thorton (ODFW Biologist - Sauvies Island, personal communication) there are no other unconfirmed or confirmed sightings near the project area. He was not aware of any sightings within the same habitat type as near the project area and it is his opinion that the Columbia River population consistently sticks to its preferred habitat type along the Columbia River and on the islands. Al Clark (USFWS Biologist - Julia Butler Hansen National Wildlife Refuge for the Columbian White-tailed Deer, personal communication) believes it is possible for a dispersing white-tailed deer, or perhaps a black-tailed/white-tailed deer hybrid, to be up in the forested landscape and away from the more typical habitat type, however, he receives more reports from the Washington side of the Columbia River rather than from Oregon. He was not aware of any other reports from the area of the Powerline Dairy Project.

The proposed Powerline Dairy project is of *NO EFFECT* upon the white-tailed deer. This is primarily based upon the lack of suitable habitat within the area and the population's tendency to utilize pasture and brushy woodlot habitats associated with tidal lowlands along the Columbia River, an area approximately 25 miles from the proposed project area. While it is possible that the individual deer sighted in the vicinity of



the project area was a dispersing white-tailed deer, it is also possible that it was either misidentified or a blacktail/whitetail hybrid which carries no protection under the ESA.

*Note: In general, the proposed project would be expected to result in an improvement of habitat for species such as deer and elk by promoting the development of vigorous herb and shrub layers within the treatment areas (both thinning and regeneration units) which are adjacent to areas affording suitable cover.*

### **Survey and Manage Wildlife Species (S&M)**

The proposed action would not appreciably impact any of the wildlife S&M species or result in the loss of population viability. This is based on the proposed project's design features, delineation of a "Mollusk Habitat Area" adjacent to unit 33-2 to protect the newly discovered known site, as well as the marginal nature of the habitats to be impacted.

### **Red Tree Vole**

Although the red tree vole is generally associated with much larger and older Douglas-fir trees than those found in the vicinity of the proposed action, the project area currently contains potential habitat for the red tree vole. The project area was surveyed to protocol in September of 1999 for the red tree vole. These surveys resulted in no red tree voles or red tree vole nests being located.

The red tree vole would be expected to benefit from the effects of thinning within the two proposed thinning units. This is based upon the fact that the treatment is expected to maintain a canopy closure of 60% or greater and trees generally favored for retention would be the largest within the stand. These trees are expected to respond to the thinning with an accelerated growth rate and increased crown development within a few years after the harvest. This will result in an increased quality of the future vole habitat within these units.

The regeneration harvest within unit 33-1 would remove approximately 22 acres of potential habitat for the red tree vole. This habitat is marginal in quality and has been surveyed and found to be unoccupied by red tree voles.

### **Mollusks**

There are several Survey and Manage invertebrate species (mollusks) with potential to be located within the proposed treatment units and/or in the general sale area.

One species of S&M slug, the papillose tail-dropper (category 1 & 2) has been confirmed west of the proposed unit 33-2. The site would be managed according to *Management Recommendations for Terrestrial Mollusk Species Prophysaon coeruleum, Blue-Gray Taildropper & Prophysaon dubium, Papillose Taildropper* version 2.0. (November 1999). As such, a "Habitat Area" has been established to the west and south of unit 33-2 to protect the papillose tail-dropper site discovered within the area (See map). No treatments would occur within this Habitat Area at this time. The habitat area would encompass approximately 2 acres of land within the Matrix land allocation which was formally being considered for treatment. This configuration is believed to be adequate to provide protection to the site and maintain the site's current micro-climate.

There are several project design features which help reduce the potential for short and longer term negative impacts to S&M mollusks and their habitat throughout the project areas. These include but are not limited to reserving all merchantable-sized hardwoods in the regeneration unit, incorporating red alder and bigleaf maple into reforestation plantings, protecting and reserving existing CWD, minimizing disturbance to the existing organic duff layer by designating skid trails and minimizing the use of fire, maintaining a canopy closure of at least 60% within the thinning units and limiting operations within Riparian Reserves.

Even though measures are incorporated into the proposed action to minimize soil disturbance, it will not be totally eliminated. Within thinning units this usually results in red alder naturally seeding into areas with disturbed soil if a seed source is available. Since adequate red alder are located near the project area, the proposed action is expected to result in an increased amount of alder growing within the treatment units which would be expected to result in some benefit to the quality of future mollusk habitat.

Even though several measures are incorporated into the proposed action to help reduce the potential for short and longer term negative impacts to S&M mollusks and their habitat, the regeneration harvest within unit 33-1 would be expected to result in approximately 22 acres of mollusk habitat being negatively impacted by the removal of the overstory. This would result in the cool moist conditions of the forest floor being altered. This habitat has been surveyed to protocol resulting in no S&M species being located.

### **Other Special Status Species:**

The proposed action would not result in the loss of population viability for any Special Status Species that may occur in the project area, or result in a trend toward federal listing under the ESA.

### **Amphibians:**

#### **Spotted Frog - (BS)**

Historically, the spotted frog was thought to be found in the vicinity of the proposed project where suitable habitat was present however, the spotted frog is not expected to be currently found in or around the project area.

Riparian reserves, including the “no cut” riparian buffers and other project design features to safeguard riparian values should provide adequate protection for the spotted frog and/or its potential breeding habitat. Thus, the proposed project should have no impact on this species.

#### **Clouded Salamander - (BT)**

Although the commercial thinning of the project area will reduce the canopy cover and will negatively impact the cool, moist microhabitats found on the forest floor for a short time (approximately 10 - 15 years) the currently marginal clouded salamander habitat within the proposed thinning units would continue to function in that capacity after harvest. In a slightly longer time frame (up to approximately 30 years) the proposed action would result in a reduced level of natural CWD recruitment within the thinning units than would occur under the no action alternative. This would have a negative impact upon clouded

salamander habitat although occasional blowdown, and disease and bug killed trees are still expected to occur and supply some CWD habitat elements to the treated stands.

The negative impact to the cool moist condition of the forest floor would be more notable and longer lived in those portions of the proposed action area receiving a heavier treatment (regeneration harvest unit or patchcuts to control *P. weirii*) than in those areas receiving a lighter treatment. Proposed management of Riparian Reserves, minimizing soil disturbance, adding CWD, and retaining and protecting existing CWD and snags should sufficiently mitigate these negative effects over both the short-term and long-term.

#### **Red-Legged Frog - (BT)**

Although red-legged frogs have not been observed in the area, there are some riparian areas within the proposed project area that contain permanent water and could function as red-legged frog breeding areas. The well shaded uplands provide good habitat for non-breeding and dispersing frogs.

The "no cut" riparian buffer provides adequate protection to the potential breeding habitat. Reducing the canopy cover within the action area will have a negative impact upon some of the cool, moist microhabitats found on the upland forest floor. This negative impact would be greater and longer lasting in those portions of the action area being treated with a regeneration harvest (22 acres) than in those areas receiving a lighter thinning treatment. Based upon the limited nature of the project, the population viability of red-legged frogs is not expected to be impacted by the proposed action.

#### **Cope's Giant Salamander - (BT)**

The "no cut" riparian buffers should provide adequate protection for this salamander and its potential breeding habitat. Thus, the Powerline Dairy Project should have little or no impact on this species.

#### **Birds:**

##### **Peregrine Falcon - (BS)**

There have not been peregrine falcon sightings recorded in the area of the proposed action; the habitat within and around the proposed action is not suitable for falcon nesting. The proposed action would have no impact upon the peregrine falcon or its habitat.

##### **Northern Goshawk - (BS)**

The proposed action is expected to have no, or a negligible short-term impact upon goshawk habitat based upon the maintenance of the "no-cut buffers" within the riparian reserves, light the nature of the proposed thinning prescription, the small scale regeneration harvest and number of reserve trees within the regeneration unit. Thinning could result in long-term benefits to goshawk habitat by maintaining or increasing the growth rates of reserve trees thus aiding the development of some late-seral stage habitat features. Overall the impacts upon goshawk habitat associated with the proposed project are expected to be negligible.

##### **Pileated Woodpecker - (BT)**

Pileated woodpeckers are dependant on some components of older forest such as large snags for drumming, roosting, nesting, and foraging and a supply of coarse woody debris for foraging. These woodpeckers are often found foraging in young stands or clearcuts but only if large stumps, snags, or

other CWD are present.

The proposed action, including the regeneration unit, would not negatively affect the short- or long-term usefulness of the action area for pileated woodpeckers based upon the limited scale of the acres treated, the light nature of the thinning prescription, and the levels of CWD, snag and green tree retention. Thinning within the Riparian Reserves should result in long-term benefits to pileated woodpecker habitat by maintaining or increasing the growth rates of reserve trees thus aiding the development of some late-seral stage habitat features contained within the reserves.

#### **Western Bluebird - (BT)**

The western bluebird is a cavity nesting species which inhabits open areas containing scattered trees or snags which are suitable for nesting. The regeneration harvest unit will result in the development of 22 acres of earlier seral habitat which would contain adequate scattered snags and green trees to provide ample opportunity for nest sites. This would benefit the quality of blue bird habitat within the area for a period of up to approximately 10 or 15 years.

#### **Lewis' Woodpecker - (BS)**

Since the mid-1960's this species has suffered a drastic decline in numbers and has been extirpated as a summer resident in many areas where formerly it was common. Based upon the fact that it is very unlikely to be found in or around the Powerline Dairy Project the proposed action would have no impact upon the Lewis' woodpecker.

#### **Mammals:**

##### **Bats**

There are no known bat roosting or hibernaculum sites within the project area.

Bats are known to forage near riparian areas, open areas, and along forest edges. The Powerline Dairy project would be expected to immediately improve the quality of bat foraging habitat within the regeneration and thinning units by opening up the canopy and creating fragmented openings in an otherwise closed canopy. The project's design features for CWD, snag and green tree protection and retention within the harvest units should provide adequate structure for roosting or resting bats and greatly reduce any short- and/or long-term negative impacts to bats which may result from the proposed project. Within the units proposed for thinning, there is potential for long term benefits to these bats as a result of the proposed action based upon the fact that it will favor the development of some older forest characteristics favored by these species.

#### **Pine Marten - (BT)**

The Powerline Dairy Project could result in some benefits to the long-term development of some pine marten habitat features. This is primarily an outcome of the 70 acres of thinning treatments which will result in maintaining or increasing the growth rates of reserve trees, thus aiding the development of some late-seral stage habitat features. These features include large trees, snags and down logs which are suitable as den sites and would help support healthy prey populations. While the 22 acres of regeneration harvest will result in a diminished quality of the habitat available to martens, the project design features for CWD, snag and green tree retention within the regeneration harvest unit should provide adequate

structure which will last into the next rotation and greatly reduce the short- and long-term negative impacts resulting from the regeneration harvest.

In general, forest management practices such as short-rotation timber harvest, single tree species management, large clearcuttings, and burning or otherwise removing slash, snags and downed logs are thought to be detrimental to marten populations. Given the fragmented ownership within the vicinity of the proposed action and the fact that much of the surrounding landscape is currently managed for timber production in such a way as to preclude the development of suitable marten habitat, the overall impacts of the proposed action upon the marten population are expected to be negligible.

#### **White-Footed Vole** - (BT)

The available literature reports that these burrowing voles use a variety of habitats, but are most closely tied to riparian alder/small stream habitats, with some researchers suggesting the presence of a mature overstory and/or an understory of “salmonberry thickets”, or sword fern, moss, and thick vine maple in those riparian habitats. The area of the proposed project affords some such habitats and it is possible that white-footed voles are using such areas.

The maintenance of the "no-cut" buffer, restricting ground based operations within Riparian Reserves and generally limiting treatments within riparian stands would help reduce the potential for any negative impacts to the white-footed vole which would be associated with implementing a harvesting operation within the area. Of the habitat for this species located within the Matrix portions of the proposed units, the negative impacts to white-footed vole would be expected to be greater in those portions treated with ground based logging systems than in the cable logged areas.

#### **Other Species of Concern**

##### **Roosevelt Elk and Black-Tailed Deer**

The project could temporarily displace individual deer and elk as they react to an increased human presence within the area. This would not impact the health of the population due to the limited length of the period of disturbance and the fact that adequate additional suitable habitat is present within the vicinity of the proposed action.

The project would result in an interspersed of foraging areas and cover and overall, it would be expected to result in an improvement in the habitat quality available for elk and deer. The regeneration harvest within unit 33-1 would create approximately 22 acres of high quality foraging/browsing habitat for elk and deer given the size and configuration of unit, proximity of untreated stands and proposal to decommission the road accessing the unit at the completion of the harvest operation. Within the thinning treatment units, the vigor of the herb and shrub understory layers should be increased thereby also improving the quality of available browse and/or forage.

Although the proposed action could have a slight, negative short-term impact upon cover for big game in portions of the thinned units, other suitable thermal and/or escape cover exists within the general area including within riparian reserves adjacent to the project units. Areas which are thinned would continue to function, in some regard as cover for big game (escape and/or thermal cover); forested stands should still serve to moderate temperature and wind extremes as well as serve as a visual buffer. The project would

not be expected to result in a short-term reduction of available cover to point where it would become a limiting factor, negatively impacting the population health of big game species. Thermal cover is probably less important or limiting within the Coast Range of northern Oregon than in other portions of these species' range, due to both the mild winters and summers within the region.

### ALTERNATIVE 3 (Cable Yarding System)

In short, this alternative differs from the proposed action by eliminating all ground based yarding, attempting to further minimize the impacts associated with the spur road constructed into unit 33-2, and by not rocking the road accessing unit 33-3 except on its steeper portions. All operations (road construction, felling, yarding hauling, road decommissioning) would occur during periods of low soil moisture (generally from June 15 through October 15). In addition, no operations would occur within unit 33-1.

Under this alternative, the positive and negative impacts associated with timber harvest upon wildlife resources would generally be reduced proportionately to reflect the reduction in acres proposed for treatment. An exception would be that the elimination of all ground based yarding would reduce the amount of disturbance to soils and litter on the forest floor thereby resulting in some added benefit to the habitat of species such as S&M mollusks and the white-footed vole.

By eliminating unit 33-1 from treatment at this time, the beneficial impacts to the habitat for species such as the western bluebird, Roosevelt elk and black-tailed deer would not be realized. However, given the relatively large amount of early seral habitat currently available on non-federal land within the vicinity, albeit that much of this habitat lacks sufficient nest sites for the western bluebird, dropping this unit from treatment would have little impact upon the populations of species benefitting from regeneration harvests. Similarly, dropping unit 33-1 from treatment would benefit the habitat of species such as the pine marten, red-legged frog, red tree vole and S&M mollusks however given the marginal nature of the habitat impacted and the small scale of the associated impacts given the design features of the proposed harvest, it would be expected that the differences in impacts to these species from that of the proposed action would be negligible.

The selection of Alternative 3 would not result in the removal of 22 acres of dispersal habitat as in the proposed action however it still *MAY AFFECT* the spotted owl through the modification of dispersal habitat. Because, this dispersal habitat would be expected to continue to function and adequate dispersal habitat is present within the watershed, it is *NOT LIKELY TO ADVERSELY AFFECT* the continued existence of the spotted owl. Positive impacts associated with thinning dispersal habitat include the development of some late seral stage habitat features, such as large trees and a diverse shrub layer, sooner than would occur without treatment; these benefits associated with the thinning would be expected to be longer-lived/greater within the Riparian Reserve land allocation based upon the likelihood of the future regeneration treatments to occur within the Matrix land allocation. In accordance with regulations pursuant to Section 7 of the Endangered Species Act of 1973, as amended, consultation with the USFWS on the Powerline Dairy Project has been completed. This project was included within the Programmatic Consultation conducted with USFWS on FY2000 Habitat Modification Projects (USFWS Biological Opinion 1-7-99-F-476). Alternative 3 is consistent with the Terms and Conditions contained within the Biological Opinion.

Selection of Alternative 3 would be of *NO AFFECT* upon the marbled murrelet, bald eagle and all other species listed under the ESA. In addition, it would not be expected to negatively impact (result in a trend toward federal listing or loss in population viability) any of the wildlife S&M, Special Status, or Species of Concern discussed above.

#### ALTERNATIVE 4 (Helicopter Yarding System)

This alternative differs from the proposed action primarily by eliminating all ground based and cable yarding and replacing it with a helicopter yarding system and by reducing the amount of road construction. Acres treated are roughly the same as in the proposed action.

Under this alternative the elimination of all ground based and cable yarding and minimizing road construction would be expected to greatly reduce the amount of disturbance to soils and litter on the forest floor. This would be of some benefit to the habitat of S&M mollusks and the white-footed vole. Helicopter yarding would also be expected to generally result in less disturbance to existing CWD than under more conventional cable or ground-based systems. In addition to S&M mollusks, this would also be of some benefit to some species including clouded salamanders and pileated woodpeckers.

While some minor differences in impacts between Alternative 2 and 4 have been identified, given the marginal nature of the habitat impacted and the small scale of the associated impacts given the design features of the proposed harvest, it would be expected that the differences in impacts to the viability of the species of concern, from that of the proposed action, would be negligible.

Alternative 4 has very similar impacts to the spotted owl as the proposed action. The regeneration harvest within unit 33-1 would remove approximately 22 acres of spotted owl dispersal habitat. Thinning within the dispersal habitat would not remove it from a condition to function as dispersal habitat and there would be some long-term benefits to the development of some suitable habitat features as a result of the thinning. With approximately 54% of the forest lands (all ownership) and approximately 82% of the BLM land within the watershed being in a condition to function as dispersal habitat, it has been determined that adequate dispersal habitat is present to facilitate owl dispersal. Although much of dispersal habitat within the watershed occurs on federal land, and its modification and removal *MAY AFFECT* the spotted owl by impacting its ability to disperse, it is *NOT LIKELY TO ADVERSELY AFFECT* the continued existence of the spotted owl based upon the fact that adequate dispersal habitat is present within the watershed. In accordance with regulations pursuant to Section 7 of the Endangered Species Act of 1973, as amended, consultation with the USFWS on the Powerline Dairy Project has been completed. This project was included within the Programmatic Consultation conducted with USFWS on FY2000 Habitat Modification Projects (USFWS Biological Opinion 1-7-99-F-476). Alternative 4 is consistent with the Terms and Conditions contained within the Biological Opinion.

Selection of Alternative 4 would be of *NO AFFECT* upon the marbled murrelet, bald eagle and all other species listed under the ESA. In addition, it would not be expected to negatively impact (result in a trend toward federal listing or loss in population viability) any of the wildlife S&M, Special Status, or Species of Concern discussed above.

#### CUMULATIVE IMPACTS

“Cumulative Effects” are the impacts on the environment which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time (CEQ 1508.7). Cumulative effects analysis provides greater insight into understanding the current environmental factors and the likely trends which might affect the environment.

The federal lands within the Dairy McKay watershed primarily fall into the Matrix or Riparian Reserve land allocations. The majority of the federal lands within the Dairy Creek watershed (Riparian Reserves) are being managed for the attainment of the Aquatic Conservation Strategy objectives, while Matrix lands are being managed for, although not limited to enhancing the future timber-producing capability of the area; managing timber stands to reduce the risk of loss from disease; providing for the maintenance of ecologically valuable structural components such as down logs, snags, large trees; providing early successional habitat; and helping to meet the planned timber sale volume for the Tillamook Resource Area PSQ (Probable Sale Quantity).

Future management actions on federal land will be in accordance with the Salem RMP which contains management direction to provide for healthy forest ecosystems with habitat that will support populations of native species and includes protection for riparian areas and waters. Since only 4.4% of the watershed is owned by the BLM, any beneficial action taken on federal land will have minimal impact on wildlife species and their habitats within the watershed. In consideration of this, coupled with the future actions expected to occur on private land, there is limited potential for improvement of habitat for species with larger home ranges requiring later-seral stage habitat characteristics, or in-stream habitat conditions within the watershed.

The majority of non-federal forestland within the watershed is owned by industrial timber companies and is managed for timber production.

There is little negative impact associated with the modification of habitat for the species of concern which utilize late-seral habitat as a result of the proposed action. This is based on the facts that the project’s design features have minimized the expected short- and long-term negative impacts of the action, and that no late-seral stage habitat is within the vicinity of the proposed action. The long-term beneficial impacts associated with the thinning portion of the Powerline Dairy Project, would primarily include the promotion some late-seral stage habitat features. This is thought to be beneficial to proper ecosystem functioning. The regeneration harvest has been designed in such a manner as to minimize negative impacts to the habitats of species of concern which utilize late-seral habitat and maximize the benefits to species which utilize earlier seral stage habitat. This has been accomplished by the condition of the stand selected for treatment, configuration and relatively small size of the regeneration unit, and design features to ensure that green trees, snags and down logs will be present in the new stand throughout the next rotation.

Based upon the age of the forests within the vicinity of the proposed action, there is no negative impact associated with the disturbance of suitable habitat for the spotted owl, marbled murrelet and bald eagle. Late-seral stage habitat is generally lacking within the Dairy Creek watershed (approximately 7% of the forested land within the watershed is greater than 80-years-old) and none is located in the vicinity of the



proposed action.

The project could result in disturbance to species of concern which will utilize younger forests and temporarily displace individuals of the more mobile species such as deer and elk. Coupling this disturbance with the impacts expected from activities on non-federal lands the health of populations of species which utilize these younger habitats is still not expected to be impacted as a result of disturbance. This is based on the facts that adequate additional suitable habitat is present within the vicinity of the proposed action and activities will generally be spread out throughout space and time in such a manner as to allow individual to move across the landscape to less disturbed areas of habitat.

Specific information on projects which have potential to disturb all wildlife species within the watershed is most available for federally funded, planned or implemented projects. These projects or program areas of work include but are not limited to the following: aerial fertilization; aerial law enforcement activities; routine aerial operations; rock quarry operations; firewood sales; young plantation maintenance; roadside brushing; hazard tree removal; forest special use permits; powerline maintenance; cone gathering; special event permits; wildlife tree and down woody debris creation projects. (See also Appendix 5 - Past, Present, and Reasonably Foreseeable Future Actions)

Several specific federal projects which are known or anticipated to take place within the Dairy McKay Watershed during the same relative time frame as the selected action have been identified. They have potential to generate disturbance and/or habitat modification impacts to the same resource values as the proposed action and therefore have been evaluated with the proposed project for cumulative impacts upon wildlife resources. They include the following:

- \* The proposed Soleburger timber sale, (currently planned to be sold about FY 2001 or later)
- \* Road stabilization within T3N., R3W., section 21
- \* Fish project within T3N., R3W., section 21
- \* "Mid-dairy" proposed thinning within numerous sections

Less information is available on potentially disturbing or habitat altering management activities to occur on non-federal lands. While private lands within the northern portion of the Oregon Coast Range, including the Dairy Watershed, support some dispersal habitat for the northern spotted owl, the suitable habitat for the spotted owl, marbled murrelet and bald eagle on these lands is very limited in quantity and marginal in quality thereby not notably contributing to the viability of the species. Before the spotted owl was listed as a threatened species under the Act, Thomas et al. estimated in *A Conservation Strategy for the Northern Spotted Owl* (1990) that most privately-owned spotted owl habitat in Oregon (mature timber which would also include bald eagle and murrelet habitat) would be eliminated within 10 years. Because the majority of private forest land within the vicinity of the proposed action area is managed for timber production, little spotted owl, bald eagle or murrelet habitat remains on these lands other than small isolated patches. Habitat conditions on these lands are not expected to significantly improve within the foreseeable future and the late-seral stage habitat that does remain is expected to be greatly reduced over time.

The cumulative impacts resulting from the proposed actions and the additional known projects would not be of a magnitude as to negatively impact wildlife species of concern. This is based on the following reasons:

- 1.) There is very little late-seral habitat within the watershed and the majority of the late-seral stage habitat within the vicinity of the identified actions is generally of marginal quality.
- 2.) The identified projects are generally separated by space and time sufficiently as to not repeatedly or continually disturb the same parcels of late-seral stage habitat.
- 3.) Currently approximately 54% of the forest land (all ownerships) within the watershed is in a condition to function as dispersal and/or suitable owl habitat.
- 4.) Standards and Guides contained within the NFP and Salem RMP including but not limited to the following: Survey and Manage guidelines; Aquatic Conservation Strategy; requirements for pre-project murrelet surveys and protection of known murrelet sites.
- 5.) The Oregon Forest Practices Act which regulates forest operations on private and state forest lands.

### **Contacts, consultants or contributors:**

#### Potential White-tailed Deer Sighting:

Al Clark, USFWS Biologist, Julia Butler Hansen National Wildlife Refuge for the Columbian White-tailed Deer, PO Box 566, Cathlamet, WA 98612, ph. (360)795-3915

Wayne Logan, BLM Biologist, Salem OR.

Elaine Sproul, USFWS Biologist and Level I team member for the North Coast Range Province (streamlined ESA Section 7 Consultation Process) 2600 SE 98<sup>th</sup> Ave., suite 100, Portland OR. ph. (503)231-6179

Tom Thorton, ODFW Biologist, Oregon Department of Fish and Wildlife, 18330 NW Sauvie Island Road, Portland, OR 97231, ph. (503)621-3025

#### References:

Washington County Soil and Water Conservation District and USDI Bureau of Land Management. 1999. *Dairy-McKay Creek Watershed Analysis*. 125pp + appendices. USDI. 1999.

USDA and USDI. November 1999. Management Recommendations for Terrestrial Mollusk Species *Prophysaon coeruleum*, Blue-Gray Taidropper & *Prophysaon dubium*, Papillose Taidropper version 2.0., 46 pages

**SPECIAL STATUS WILDLIFE SPECIES KNOWN TO BE OR POTENTIALLY  
FOUND IN THE VICINITY OF THE POWERLINE DAIRY PROJECT**

<u>Scientific Name</u>	<u>Common Name</u>	<u>Federal Status</u>	<u>Bureau Status</u>
<b>INVERTEBRATES</b>			
<b><u>Terrestrial Snails</u></b>			
<i>Cryptomastix devia</i>	Puget oregonian	S&M	
<i>Megomphix hemphilli</i>	Oregon megomphix	S&M	
<b><u>Terrestrial Slugs</u></b>			
<i>Deroceras hesperium</i>	evening fieldslug	S&M	
<i>Hemphillia glandulosa</i>	warty jumping-slug	S&M	
<i>Hemphillia malonei</i>	Malone jumping-slug	S&M	
<i>Prophysaon coeruleum</i>	blue-gray tail-dropper	S&M	
* <i>Prophysaon dubium</i>	papillose tail-dropper	S&M	
<b>AMPHIBIANS</b>			
<i>Aneides ferreus</i>	clouded salamander		BT
<i>Dicamptodon copei</i>	Cope's giant salamander		BA
* <i>Rana aurora</i>	red-legged frog		BT
<i>Rana pretiosa</i>	spotted frog		BS
* <i>Ascaphus truei</i>	tailed frog		BT
<b>BIRDS</b>			
<i>Accipiter gentilis</i>	northern goshawk		BS
<i>Brachyramphus marmoratus</i>	marbled murrelet	FT	FL
* <i>Dryocopus pileatus</i>	pileated woodpecker		BT
<i>Melanerpes lewis</i>	Lewis' woodpecker		BS
<i>Falco peregrinus</i>	peregrine falcon		BS
<i>Haliaeetus leucocephalus</i>	bald eagle	FT	FL
<i>Sialia mexicana</i>	western bluebird		BT
<i>Strix occidentalis caurina</i>	northern spotted owl	FT	FL
<b>MAMMALS</b>			
<i>Martes americana</i>	pine marten		BT
<i>Arborimus albipes</i>	white-footed vole		BT
<i>Plecotus townsendi</i>	western big-eared bat		BS
<i>Myotis thysanodes</i>	fringed myotis	NFP	BT
<i>Myotis evotis</i>	long-eared bat	NFP	BT
<i>Myotis volans</i>	long-legged bat	NFP	BT
<i>Lasionycteris noctivagans</i>	silver-haired bat	NFP	BT
<i>Arborimus longicaudus</i>	red tree vole	S&M	

**KEY for Table 1:**

FT = Federally Threatened

FE = Federally Endangered

S&M = Survey and Manage Species

NFP = Species identified in the Northwest Forest Plan

BS = Bureau Sensitive Species

AS = Bureau Assessment Species

BT = Bureau Tracking Species

\* = Confirmed (observed) in the vicinity of the proposed action.

## APPENDIX 4 - ENVIRONMENTAL ELEMENTS

Environmental Assessment Number OR-086-99-03

In accordance with law, regulation, executive order and policy, the Powerline Dairy interdisciplinary team reviewed the elements of the environment to determine if they would be affected by the proposed action described in Chapter 2 of the EA (environmental assessment). The following two tables summarize the results of that review.

**Table 1. Critical Elements of the Environment.** This table lists the critical elements of the environment which are subject to requirements specified in statute, regulation, or executive order and the interdisciplinary team's predicted environmental impact per element if the proposed action described in Chapter 2 of the Environmental Assessment was implemented.

CRITICAL ELEMENTS OF THE ENVIRONMENT	ENVIRONMENTAL EFFECT	INTERDISCIPLINARY TEAM'S COMMENTS
Air Quality	Minimal Effect	<p>This element was not identified as a major issue. The major sources of potential air pollutants associated with the proposed action are smoke from prescribed burning (e.g., burning of landing debris if determined to be a fire hazard), and dust from the use of unsurfaced roads and road construction/maintenance (Salem District Resource Management Plan Final Environmental Impact Statement, p. Chapter 4-8). The project area is within 13 miles of the cities of Vernonia, Banks, St. Helens, and Scappoose. There are no rural residences located in the vicinity of the proposed treatment units, nor are there along the unsurfaced roadway portion of the proposed haul route. The project area is not within an Oregon Smoke Management designated area.</p> <p>Since burning would be conducted in accordance with the <i>Oregon State Implementation Plan</i> and <i>Oregon Smoke Management Plan</i>, the impact of smoke on air quality is predicted to be local and of short duration. Dust created from vehicle traffic on gravel or natural-surface roads, road construction, and logging operations is predicted to be localized and of short duration. As such, the proposed action would have no adverse impact on air quality and would comply with the provisions of the Clean Air Act.</p>

**Table 1. Critical Elements of the Environment.** This table lists the critical elements of the environment which are subject to requirements specified in statute, regulation, or executive order and the interdisciplinary team's predicted environmental impact per element if the proposed action described in Chapter 2 of the Environmental Assessment was implemented.

CRITICAL ELEMENTS OF THE ENVIRONMENT	ENVIRONMENTAL EFFECT	INTERDISCIPLINARY TEAM'S COMMENTS
Areas of Critical Environmental Concern	None	This element was not identified as a major issue. There is no ACEC located within or near the project area.
Cultural, Historic, Paleontological	None	This element was not identified as a major issue. Cultural resources were conducted and no cultural resources were identified. (Project Record documents 1 & 2).
Native American Religious Concerns	None	This element was not identified as a major issue. Tribes were contacted during scoping and no concerns were identified (Project Record document 16).
Threatened or Endangered Plant Species	None	This element was not identified as a major issue. There are no Threatened or Endangered Plant Species located within the project area. See Appendix 8 - Biological Evaluation for Special Status Plant Species/Survey & Manage and Noxious Weeds.
Threatened or Endangered Wildlife Species or Habitat	Minimal Effect  <i>May Effect but not likely to adversely affect the spotted owl due to the modification and removal of dispersal habitat.</i>	This element was not identified as a major issue. There are no Threatened or Endangered Wildlife Species or Suitable Habitat located within the project area. Programmatic Consultation with USFWS has been completed (USFWS Biological Opinion 1-7-99-F-476). Also see Appendix 3 - Biological Evaluation for Wildlife Resources for additional information.

**Table 1. Critical Elements of the Environment.** This table lists the critical elements of the environment which are subject to requirements specified in statute, regulation, or executive order and the interdisciplinary team's predicted environmental impact per element if the proposed action described in Chapter 2 of the Environmental Assessment was implemented.

CRITICAL ELEMENTS OF THE ENVIRONMENT	ENVIRONMENTAL EFFECT	INTERDISCIPLINARY TEAM'S COMMENTS
Threatened or Endangered Fish Species or Habitat	<p>Minimal Effect</p> <p><i>"May Affect, Likely to Adversely Affect"</i> the upper Willamette Steelhead</p> <p><i>"May Affect, Not Likely to Adversely Affect"</i>, Lower Columbia River steelhead trout, SW Washington/Lower Columbia River coastal cutthroat trout, Oregon Coast coho salmon, Oregon Coast steelhead trout, and Oregon Coast coastal cutthroat trout</p> <p><i>"No Effect"</i> Lower Columbia River chinook salmon, Columbia River chum salmon and SW Washington/Lower Columbia River coho salmon</p> <p>See Chapter 3 of the EA</p>	<p>See Chapter 3 of the EA</p> <p>A BA has been prepared, however NMFS is not accepting any BA with a LAA call at this time, due to litigation. When NMFS is able to complete consultation on LAA projects a BA will be submitted for consultation.</p>
Prime or Unique Farm Lands	None	This element was not identified as a major issue. There is no prime or unique farm lands located within the project area.



**Table 1. Critical Elements of the Environment.** This table lists the critical elements of the environment which are subject to requirements specified in statute, regulation, or executive order and the interdisciplinary team's predicted environmental impact per element if the proposed action described in Chapter 2 of the Environmental Assessment was implemented.

CRITICAL ELEMENTS OF THE ENVIRONMENT	ENVIRONMENTAL EFFECT	INTERDISCIPLINARY TEAM'S COMMENTS
Flood Plains	None	This element was not identified as a major issue. There are no flood plains in or near the project area. Refer to Chapter 3 of the EA and Appendices 6 and 7 for discussion of the environmental effects.
Hazardous or Solid Wastes	None	This element was not identified as a major issue. There is not predicted to be any environmental effects associated with this element due to the implementation of the Best Management Practices contained in the <i>Salem District Resource Management Plan</i> and the terms/conditions of the timber sale contract, including section 26 (refuse control and disposition of waste material), section 27 (storage and handling of hazardous waste), and section 28 (safety and health). Failure to comply with the terms and conditions of the timber sale contract can result in violations, suspensions or cancellation of the contract as per section 10.
Water Quality (Surface and Ground)	Minimal Effect - See Chapter 3 of the EA	Impacts to surface water quality was identified as a major issue. See chapter 3 of the EA for a detailed analysis of the impacts to water quality.
Wetlands/Riparian Zones (Executive Order 11990, Protection of Wetlands, 5/24/77)	Minimal Effects	This element was not identified as a major issue. While the project proposes to thin up to approximately 16 acres of Riparian Reserve, project design features such as the maintenance of "no cut buffers" and the restriction upon the use of ground-based equipment assure the protection of wetland and riparian zones. Also see Appendix 7.

**Table 1. Critical Elements of the Environment.** This table lists the critical elements of the environment which are subject to requirements specified in statute, regulation, or executive order and the interdisciplinary team's predicted environmental impact per element if the proposed action described in Chapter 2 of the Environmental Assessment was implemented.

CRITICAL ELEMENTS OF THE ENVIRONMENT	ENVIRONMENTAL EFFECT	INTERDISCIPLINARY TEAM'S COMMENTS
Wild and Scenic Rivers	None	This element was not identified as a major issue. There is no wild and scenic river located within the project area.
Wilderness	None	This element was not identified as a major issue. There is no wilderness located within the project area.
Invasive, Nonnative Species (includes Executive Order 13112, Invasive Species, 2/3/99)	Minimal Effect	This element was not identified as a major issue. See Appendix 8 - Biological Evaluation for Special Status Plant Species/Survey & Manage and Noxious Weeds.
Environmental Justice (Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, 2/11/94)	Minimal Effect	This element was not identified as a major issue. The proposed action would yield approximately 2 million board feet of merchantable timber over a 3 year period which would result in minimal impact to the local economies. The proposed action is not anticipated to have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

**Table 2. Other Elements of the Environment.** This table lists other elements of the environment which are subject to requirements specified in law, regulation, policy, or management direction and the interdisciplinary team's predicted environmental impact per element if the proposed action described in Chapter 2 of the Environmental Assessment was implemented.

ELEMENTS OF THE ENVIRONMENT	ENVIRONMENTAL EFFECT	INTERDISCIPLINARY TEAM'S COMMENTS
Land Uses (including mining claims, mineral leases, etc.)	None	This element was not identified as a major issue. There is an existing BPA Powerline right-of-way through the section which contains the proposed project. The IDT accommodated this fact during the development of the proposed action and alternatives.
Minerals	None	This element was not identified as a major issue. The proposed action does not include the extraction of any mineral resource. As such, this element would not be affected by the proposed action.
Recreation	None	This element was not identified as a major issue.
Soils	Minimal Effects - see chapter 3 of the EA	This element was identified as a major issue. See chapter 3 of the EA
Visual Resources	None	This element was not identified as a major issue. The proposed action is within VRM IV. The project has been determined to be consistent with the visual resource management objectives for this classification. (Project record document # 40)
Water Resources (including Aquatic Conservation Strategy Objectives, beneficial uses [Salem FEIS Chapter 3-9], DEQ 303d listed streams, water temperature, sedimentation, water quantity, etc.)	Minimal Effects - see chapter 3 of the EA	This element was identified as a major issue. See chapter 3 of the EA, and Appendices 5, 6 and 7.

**Table 2. Other Elements of the Environment.** This table lists other elements of the environment which are subject to requirements specified in law, regulation, policy, or management direction and the interdisciplinary team's predicted environmental impact per element if the proposed action described in Chapter 2 of the Environmental Assessment was implemented.

ELEMENTS OF THE ENVIRONMENT	ENVIRONMENTAL EFFECT	INTERDISCIPLINARY TEAM'S COMMENTS
Bureau Sensitive and Special Attention Plant Species/Habitat (including Survey and Manage, and protection buffer species)	Minimal Effect	This element was not identified as a major issue. See Appendix 8 Biological Evaluation for Special Status Plant Species/Survey & Manage and Noxious Weeds.
Bureau Sensitive and Special Attention Wildlife Species/Habitat (including Survey and Manage mammals and mollusks)	Minimal Effect	This element was not identified as a major issue. One S&M mollusk site was identified and a "Habitat Area" was established to assure its protection. See Appendix 3 - Biological Evaluation for Wildlife Resources for additional information.
Fish Species with Bureau Status	Minimal Effect	see chapter 3 of the EA
Rural Interface Areas	None	This element was not identified as a major issue. There are no rural interface areas located within the project area.
Coastal Zone (affect on "any land or water use or natural resource of the coastal zone." The determination of effects should include "direct, indirect, cumulative, secondary, and reasonably foreseeable effects")	None	This element was not identified as a major issue. The project area is <b>not</b> located within Oregon's Coastal Zone boundary. However, the proposed action appears to be consistent with the applicable statewide planning goals identified in the Oregon Coastal Management Program.
Other (specify)		

## APPENDIX 5

### PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

The past, present, and reasonably foreseeable future actions within the Dairy-McKay Creek watershed are listed below, and are followed by a discussion of the character of the watershed and the affects of those actions on the relevant resources within the watershed. The cumulative effects of the past, present and reasonably foreseeable actions will be discussed as applicable in the effects analysis contained in chapter 3 of the EA for the soil/water major issue, as well the three other elements of the environment (vegetation, wildlife, fish).

#### Actions

*Past:* \* high rate of logging since the turn of the 20<sup>th</sup> century with associated actions including railroad logging, splash damming/log driving, road construction, and milling \* dispersed recreational use including hunting and fishing \* minor amount of mineral extraction (primarily sand, gravel, crushed rock, bauxite) \* homestead settlement \* expansion of agriculture \* municipal and domestic uses of water including water diversions \* gathering of special forest products such as rails, poles, western red cedar, and firewood \* municipal and domestic uses of water including water diversions \* some vandalism and refuse dumping \* fire, including prescribed fire (probable wildfire intervals ranging from 150 to 350 years) \* fire suppression \* storm events \* streams channelized \* clearing large wood from stream channels \* Coho salmon originally introduced into the Dairy Creek watershed in the 1920's \* hatchery influence on wild fish stock; approximately 82,000 steelhead and 165,000 coho were released in McKay Creek and its tributaries from 1983 to 1986.

*Present:* \* logging with harvest rates below historic levels \* relative high road density (approximately 4.3 miles of road per square mile on GIS database and an estimated 6.0 miles of actual roads, including new roads and legacy roads, per square mile) \* high stream crossing density (3.1 crossings per square mile for streams) \* dispersed recreational use including hunting, fishing, and OHV (off-highway vehicle) \* urban and rural development (2% per year) including supporting services \* agriculture \* manufacturing \* minor amount of gathering of special forest products such as mushrooms, firewood, and landscape vegetation \* active water right permits \* vandalism, resource thefts, and dumping garbage \* storm events \* effects from past stocking of hatchery fish.

*Reasonably Foreseeable:* \* logging on private land with the assumption of much of the merchantable aged timber will be harvested in accordance with the Oregon Forest Practices Act within the next ten years and the resultant clearcuts will then be intensively managed (thinning, spraying herbicide, etc.) \* increased road density proportional to rural development and timber harvest rates \* logging and other silvicultural treatments on federal land at current levels \* increased recreational use proportional to increased population in the vicinity \* no new mineral extraction, except sand, gravel and crushed rock, due to the low quality and/or quantity of other minerals \* continued rural and urban development \* gathering of special forest products such as mushrooms, firewood, and landscape vegetation at or above current levels \* increased vandalism, resource thefts, and refuse dumping \* implementation of some stream enhancement projects by the BLM, Tualatin Watershed Council, private landowners, or others \* storm events \* decommissioning roads on federal land \* continuing effects from past stocking of hatchery fish \*

voluntary implementation of the Oregon Plan for Salmon and Watersheds.

Currently, BLM has no active timber sales in the Dairy-McKay Creek Watershed. However, the Tillamook Resource Area is in the initial stages of planning two different timber sales in the watershed. Based upon current information, the first proposal, called Soleburger would be located in T2N R2W sections 15 and 21, and the second called the Dairy Creek Timber Sale would be located in T3N T3W sections 27, 3, and 29. Initial inventories, scoping and planning for these two potential sales will primarily occur during FY'00 and FY'01. It is anticipated that both of these sales would be sold during FY '01. Together these two sales would probably harvest up to approximately 5 million board feet of timber, and would be harvested roughly between the years 2002 and 2005.

### Introduction

The Dairy-McKay watershed drains 231 square miles (147,956 acres). It is the largest watershed contributor to the Tualatin River, constituting nearly one-third of the entire Tualatin basin. The Dairy-McKay watershed is located northwest of the city of Hillsboro, Oregon, near which it joins the Tualatin River. Most of the watershed headwaters originate to the north in the Tualatin Mountains, part of the Coast Range. Water flows off the Tualatin mountains down the foothills onto Tualatin plain and valley. The principal drainages in the watershed are East Fork Dairy Creek, West Fork Dairy Creek, and McKay Creek.

Elevations within the watershed range from 115 feet above sea level (ASL) at the confluence Dairy Creek and Tualatin River to 2,265 feet ASL at Long Peak in the Tualatin mountains. The Tualatin mountains and surrounding foothills are composed mainly of broad ridges that are highly dissected by many draws and creeks. Slopes are generally short and steep and are forested mostly with conifers, and some hardwoods, of various age classes. The vast majority of timber is less than 70 years of age. The Tualatin plain constitutes the southern 30% of the watershed with the vast majority of this plain being below 200 feet (ASL) in elevation. The average annual precipitation ranges from 38 inches at Hillsboro to 67 inches near the headwaters of the East Fork of Dairy Creek. Approximately 72% of the precipitation falls between November and March.

The Tualatin mountains are underlain by volcanic and sedimentary rocks formed during the Eocene and Oligocene ages of the Tertiary period. The volcanic rocks are mainly basaltic lavas and tuffs, and are overlain by the sedimentary rocks, which are mainly shale, sandstone, and siltstone.

Land in the Dairy-McKay watershed is primarily privately owned. About 19% is owned by large private industrial wood product companies and 76% is owned by private individuals or smaller companies. Public land, managed by the BLM (Bureau of Land Management), makes up most of the remaining land within the Dairy-McKay watershed. BLM holdings comprise 6,521 acres of forested land, roughly 4.4% of the watershed. Most of these lands are Oregon and California Railroad (O&C) lands. Due to this legacy, these lands are distributed in a patchy, checkerboard fashion, rather than in a single contiguous block.

### Condition of Relevant Resources

*The Dairy-McKay Watershed Analysis* (Washington Co. SWCD and BLM 1999) contains a detailed discussion of the existing condition (reflective of past and present actions) and reference condition of the Dairy-McKay watershed. The following resource condition information is taken in part from the watershed analysis with the addition of a discussion of the predicted trend in the condition of the relevant

resources within the watershed in consideration of the reasonably foreseeable actions. This discussion is based in part upon the professional opinion of the Powerline Dairy interdisciplinary team.

**Vegetation:** The Dairy-McKay Creek watershed is located within the western hemlock zone. Subclimax Douglas-fir dominates most stands in the watershed. Over time, and in the absence of major disturbance, the eventual climax community would be dominated by western hemlock along with western red cedar. Old-growth stands (400 to 600 years old) in this zone, however, still retain a major component of Douglas-fir. A common situation within the watershed is the development of dense, even-aged stands of Douglas-fir. This pattern is encouraged by extensively planting this species following timber harvest and intensively managing competing vegetation in the young developing plantations.

Plant associations common in this watershed include western hemlock/salal, western hemlock/vine maple-salal, western hemlock/swordfern, western hemlock/vine maple/swordfern, and western hemlock/dwarf Oregon grape-salal.

About 3% of the watershed is in the mature stand condition<sup>1</sup>; it is unlikely that any appreciable portion of these stands are forested with old-growth timber. Younger structural stages dominate forests within the watershed. The small conifer<sup>2</sup>, sapling/pole<sup>3</sup>, shrub<sup>4</sup>, and grass-forb<sup>5</sup> conditions dominate the watershed, with 40% of the total watershed area included in these forest structural stages.

Timber stands in the headwater reaches typically consist of large patches of even-aged stands. Average patch size decreases lower in the watershed and near major streams. Much of this fragmentation is between forest and non-forest land, and reflects ownership patterns within the watershed.

Laminated root rot, caused by the fungus *Phellinus weirii*, is widespread (11% of the area) and has a major influence on the character of many Douglas-fir stands in the watershed (windthrown, standing dead, and live symptomatic trees, along with a relatively well-developed shrub layer; disease centers ranging from less than one acre to several acres; and loss in timber productivity). *P. weirri* readily infects and kills highly susceptible conifer species such as Douglas-fir and grand fir. Western hemlock is considered intermediately susceptible and western red cedar is thought to be resistant to the disease. All hardwoods species are immune.

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<sup>1</sup> The mature condition begins at about age 75, the average diameter of the conifer trees is 21 inches or larger.

<sup>2</sup> The small conifer stand condition is characterized by a closed canopy dominated by Douglas-fir in a single layer and sparse ground cover. This stand condition can last from about age 35 to 75.

<sup>3</sup> The sapling/pole stand condition begins at about stand age 15.

<sup>4</sup> The shrub stand condition can last from about age 3 to 10.

<sup>5</sup> The grass-forb condition occurs after regeneration timber harvest and slash disposal and can last from 2 to 5 years.

Most of the riparian areas within the upper, forested portions of the watershed are dominated by red alder. Occasionally, however, large conifers and bigleaf maple occur within the alder stands. Most alder-dominated riparian stands are 50-60 years old. The stream buffers on private lands are typically on third-order and larger streams and are generally quite narrow (usually the width of one normal tree spacing). Many of the buffers on private lands have been windthrown.

The location and extent of exotic plant and noxious weed infestations are not well known within the watershed at this time. In a BLM 1998 survey, five species received special attention. These five included Scotch broom, Himalayan blackberry, reed canarygrass, bull thistle and Canada thistle. Roadsides and other disturbed sites were selected for surveys. Surveyors found that blackberries were nearly universal at survey sites. Reed canarygrass was also abundant, particularly in riparian areas. Scotch broom was also common.

The trend on private land is to harvest stands while they are still well within the small conifer stage. The present ownership pattern and federal land allocations will most likely continue to maintain a landscape pattern characterized by early seral stage stands (primarily Douglas-fir plantations) and a high degree of forest fragmentation. Past and present forest management activities (primarily timber harvest and road construction) has resulted in greatly reduced amounts of legacies (green trees, snags, and coarse woody debris) from the previous stands, degraded riparian habitat, and the spread of exotic plants and noxious weeds. Future management actions on federal land will be in accordance with the Salem RMP (Resource Management Plan), May 1995, which contains management direction to provide for "legacies," restore and maintain the ecological health of riparian ecosystems, and contain and/or reduce noxious weed infestations. Since only 4.4% of the watershed is owned by the BLM, any action taken on federal land will have minimal impact on these elements within the watershed as a whole. In consideration of this, coupled with the future actions expected to occur on private land, there is limited potential for improvement in the amount of "legacies," riparian habitat condition, or the rate of spread of noxious weeds in the watershed.

**Soil Resource:** Soils in the Tualatin mountains are mainly deep, well-drained, productive, and resilient soils. They formed over basalt, tuffs, mixed sedimentary rock, and mixed materials. Soil textures are generally silt loam over silt loam or silty clay loam. Typical soil series are the Tolany, Olyic and Melby. Soils in the Tualatin plain are typically very deep, high in silt and clay and are commonly poorly drained.

Forest hillslopes are generally stable. Landslides, in the form of debris avalanches and debris flows, occur most frequently on steep, (greater than 70%) stream-adjacent slopes. Steep slopes and inner gorge stream-adjacent bank failures are especially prone to landslides when the soil is disturbed by human activities such as logging and road construction. Large deep-seated landslides are associated with deeply weathered sedimentary rock and recent long periods of high precipitation. Roads are the most appreciable source of anthropogenic surface erosion and sediment on forest lands. The mean road density for the watershed is 4.28 miles of road per square mile. About 1000 miles of roads, of which 31 miles occur on BLM lands. Compacted and otherwise disturbed surfaces, such as roads and OHV trails, are a chronic source of sediment in the watershed. Stream bank erosion is most appreciable on higher order streams not confined by valley walls. It has increased due to altered hydrology, channelization and loss of riparian vegetation.



The current condition for erosion processes varies from the reference condition in the rate and timing of erosion. Under reference conditions major disturbances (wind, floods, fire, and landslides) are estimated to have occurred once every 200 years. Low surface erosion would have occurred after the major disturbance in impulses, for about 20 to 40 years. It is believed that 80 to 90% of the time the watershed had low surface erosion rates. Removal of vegetation, compaction and displacement of soil from logging and road construction, etc. has increased erosion rates over a much longer time than under natural conditions. In addition, the type of material delivered to stream channels and riparian areas from landslides has changed. Landslides were a major source of large woody debris in streams in historic times. Large areas of adjacent stream sides were formerly covered by older timber. With the younger timber that dominates the watershed today, there is little or no large wood input to the channels from landslides.

Future management actions on federal land will be in accordance with the Salem RMP which contains management direction to maintain and restore the sediment regime under which aquatic ecosystems evolved. Since only 4.4% of the watershed is administered by the BLM, any action taken on federal land will have minimal impact on the sediment regime within the watershed. In consideration of this, coupled with the future actions expected to occur on private land, there is limited potential for improvement in the sediment regime in the watershed.

**Water:** The beneficial uses of water in the Willamette Basin are listed in the Oregon Administrative Rules (OAR 340-41-442). The major beneficial uses of water in Dairy Creek watershed include domestic and municipal consumption, cold water fisheries (including anadromous fishes), recreation, irrigation, industrial/manufacturing, livestock watering, and wildlife. The following table summarizes the beneficial use of a stream and its distance from the project area.

<b>Appendix 5 -Table 1. Beneficial Uses for Upper Dairy Creek Watershed</b>				
<b>Beneficial Use</b>	<b>Data Source</b>	<b>Stream</b>	<b>Upstream Project Action</b>	<b>Distance from Project Action</b>
Resident Fish	BLM	East Fork Dairy Cr. and un-named tributaries	All Units	0.05 - .75 miles
Resident Fish	BLM	Un-named tribs. to East Fork Dairy Creek	All Units	0.05 - 0.75 miles
Anadromous Fish (Listed)	BLM	East Fork Dairy Creek	All Units	0.5 miles
Municipal Use	WRIS	East Fork Dairy Creek	All Units	>10miles
Domestic Use	WRIS	East Fork Dairy Creek	Unit 33-3	6 miles

Water flows are an important concern, particularly during summer months. The Oregon DEQ (Department of Environmental Quality), Water Resources Division, lists 540 active water right permits within the watershed. Over 90% of the water rights are allocated for irrigation. Nearly 65% of potential diversion are permitted for Dairy Creek, West Fork Dairy Creek below Banks and East Fork below Murtagh Creek. Future urban growth is expected to increase water needs dramatically. Washington County is predicting a 94% increase in population between 1997 and 2007.

Dairy Creek is identified as water quality limited by Oregon DEQ in the Oregon's Final 1998 Water Quality Limited Streams - 303(d) List. East Fork Dairy Creek is water quality limited due to low summer pH and high temperatures. Dairy Creek below the confluence of the east and west forks has excessive bacteria (*E coli*) year-round, and high temperatures in the summer.

The *Dairy-McKay Watershed Analysis* (1999) identified high phosphorus levels throughout most of the watershed. High phosphorous levels in streams can lead to reduced dissolved oxygen, algal blooms, fish kills, and foul odors. The source of phosphorous is likely from increased fertilizer use, urban runoff and leaching, and fine sediment from phosphorus rich soils. Water temperature and sediment were identified as likely water quality problems, however no data was available to substantiate any specific problems. The streambed substrates in riffles generally contains low to moderate levels of fines, indicating that sediment accumulation in spawning gravels is not a major concern. Data collected from macro-invertebrate surveys indicates that the water quality is good in the upper portion of the Dairy Creek.

Past and present actions, primarily timber harvest, road construction, and residential development, have influenced the hydrologic processes of the watershed to the point that the most of the stream channels are not in "proper functioning condition." Future management actions on federal land will be in accordance with the Salem RMP which contains management direction to maintain or restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Since only 4.4% of the watershed is

administered by the BLM, any action taken on federal land will have minimal impact on water quality within the watershed. In consideration of this, coupled with the future actions expected to occur on private land, there is limited potential for improvement in the hydrologic processes of the watershed.

**Fisheries:** Steelhead (*Oncorhynchus mykiss*) are the only anadromous fish native to the Dairy Creek watershed. In March of 1999, the upper Willamette ESU (evolutionarily significant unit) of steelhead, which includes the steelhead within the Dairy Creek watershed, were federally listed as threatened under the ESA (Endangered Species Act). Dairy Creek also falls within the Upper Willamette chinook salmon (*O. tshawytscha*) ESU area, also listed as threatened, however, chinook are not known to inhabit this watershed, currently or historically. Coho salmon are present due to hatchery releases but are not native above Willamette Falls. Hatchery steelhead have also been released within the Dairy Creek watershed. Cutthroat trout are relatively abundant and distributed throughout the watershed (Washington Co. SWCD and BLM 1999). Non-salmonid species include Pacific lamprey, western brook lamprey, reticulate sculpin, torrent sculpin and reddsider shiner.

Salmonids differ somewhat in their habitat, but all require cool water, structurally diverse channels and clean spawning gravel for maintenance of healthy populations. Less is known about the requirements of the non-salmonid species, however the same general habitat features are expected to benefit them as well. Large wood pieces play a vital role in maintaining channel complexity by creating scour to form pools, recruiting and maintaining spawning gravel, and providing cover.

The *Dairy-McKay Watershed Analysis*, (Washington Co. SWCD and BLM 1999), identified increased sedimentation and decreased large woody debris inputs as the major factors affecting salmonid habitat within the Dairy Creek watershed. Salmonid habitat, especially in the mainstems, is generally limited in the Tualatin Plain, and used mainly as migration corridors. The Tualatin Mountain portions of the drainage provide some quality salmonid habitat, however much of the habitat has been diminished due to past land management actions. An estimated 69 miles of stream in the Dairy Creek watershed are on the ODEQ (Oregon Department of Environmental Quality) water quality limited list. Water quality problems include excessive *E. coli* counts, high water temperature, low dissolved oxygen and low pH.

Numbers of Upper Willamette steelhead spawners have had a steep and continuing decline since 1988. The decline has been attributed mainly to destruction and modification of habitat, overutilization for recreational purposes, and natural and human-made factors (Federal Register: March 10, 1998, Vol. 63, No. 46, Proposed Rules, pp. 11797-11809). Though cutthroat trout are described as relatively abundant, it is likely that they are experiencing a downward trend for the same reasons as steelhead. Trends for other fish species within the watershed are mostly unknown, but are suspected to be downward given the habitat limitations described above.

Future management actions on BLM land will be in accordance with the Salem RMP which contains management direction to maintain or restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems, and to maintain or enhance fisheries potential. Since only 4.4% of the watershed is owned by the BLM, any action taken on federal land will have minimal impact on fish species and their habitats within the watershed. The BLM will likely pursue cooperative efforts with the Tualatin Watershed Council, private landowners and others to implement instream habitat improvements, which would lead to some improvement in aquatic habitat conditions throughout the watershed. In

addition, the *Oregon Plan for Salmon and Watersheds* should lead to some improvement in aquatic habitat, though to what extent is unknown as this is a largely volunteer effort.

**Wildlife:** The Dairy-McKay watershed is strongly dominated by fragmented, early seral stage habitats which are primarily located on intensively managed industrial forest lands. As a consequence of patches of younger, small conifers and larger aggregated clearcuts being distributed across the landscape, the area is permeated with high contrast edges and contains little interior forest habitat. Many forested riparian corridors have been harvested or reduced to thin strips of red alder.

In general, past and present actions have resulted in little or no habitat for those species dependent upon later-seral stage habitat including snags or coarse woody debris, large blocks of interior forested habitat or diverse, cool, shaded, riparian habitats within the watershed. Conversely, there is a great deal of habitat for those species which depend upon or utilize earlier-seral stage habitats, smaller patches and the juxtaposition of differing habitat types. Overall, the in-stream habitat conditions within the watershed are poor. Future management actions on federal land will be in accordance with the Salem RMP which contains management direction to provide for healthy forest ecosystems with habitat that will support populations of native species and includes protection for riparian areas and waters. Since only 4.4% of the watershed is owned by the BLM, any action taken on federal land will have minimal impact on wildlife species and their habitats within the watershed. In consideration of this, coupled with the future actions expected to occur on private land, there is limited potential for improvement of habitat for species with larger home ranges requiring later-seral stage habitat characteristics, or in-stream habitat conditions within the watershed.

## APPENDIX 6. Matrix of Pathways and Indicators

### CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF PROPOSED ACTION(S) ON RELEVANT INDICATORS AT THE **PROJECT LEVEL - Alternative 1 (No Action)**

**Administrative Unit:** Salem District BLM

**5th field watershed:** Dairy Creek

**Project:** Powerline Dairy Timber Sale

**6th Field watershed:** Upper East Fork Dairy Creek

FACTORS  INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)		
	Properly Functioning	At Risk	Not Properly Functioning	Restore	Maintain	Degrade
<u>Water Quality:</u> Temperature		X			X	
Turbidity			X		X	X <sup>3</sup>
Chem. Contam./Nut.		X			X	
Overall (303d reaches)		X			X	
<u>Habitat Access:</u> Physical Barriers			X		X	
<u>Habitat Elements:</u> Substrate/Sediment	X				X	X <sup>3</sup>
Large Woody Debris (LWD)		X			X	
Pool Area %			X		X	
Pool Quality			X		X	
Pool Frequency		X			X	
Off-Channel Habitat			X		X	
<u>Channel Cond. &amp; Dyn.:</u> Streambank Condition	X				X	
Floodplain Connectivity		X			X	
<u>Watershed Condition:</u> Road Des. & Loc.			X		X	
Disturbance History			X		X	
Stream Influence Zone			X		X	
Refugia		X			X	

X<sup>1</sup> - Potential short-term adverse effects, with long term maintenance of indicator (short term is considered to be the duration of the project, generally 1 year or less, but possibly intermittently up to 3 years).

X<sup>2</sup> - Potential short-term adverse effects, with long term restoration of indicator

X<sup>3</sup> - Possible degrade in the long-term as a result of no action.

X<sup>4</sup> - Short-term maintenance of the indicator, with long-term restoration

Effects are based on which way this project is likely to move the relevant indicator, but no change in baseline condition is expected.

CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF PROPOSED ACTION(S) ON RELEVANT INDICATORS AT THE **PROJECT LEVEL - Alternative 2 (Proposed Action)**

**Administrative Unit:** Salem District BLM

**5th field watershed:** Dairy Creek

**Project:** Powerline Dairy Timber Sale

**6th Field watershed:** Upper East Fork Dairy Creek

FACTORS  INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)		
	Properly Functioning	At Risk	Not Properly Functioning	Restore	Maintain	Degrade
<u>Water Quality:</u> Temperature		X			X	
Turbidity			X	X <sup>2</sup>		X <sup>2</sup>
Chem. Contam./Nut.		X			X	
Overall (303d reaches)		X			X	
<u>Habitat Access:</u> Physical Barriers			X		X	
<u>Habitat Elements:</u> Substrate/Sediment	X				X <sup>1</sup>	X <sup>1</sup>
Large Woody Debris (LWD)		X			X	
Pool Area %			X		X	
Pool Quality			X		X	
Pool Frequency		X			X	
Off-Channel Habitat			X		X	
<u>Channel Cond. &amp; Dyn.:</u> Streambank Condition	X				X	
Floodplain Connectivity		X			X	
<u>Watershed Condition:</u> Road Des. & Loc.			X	X <sup>2</sup>		X <sup>2</sup>
Disturbance History			X		X	
Stream Influence Zone			X		X	
Refugia		X			X	

X<sup>1</sup> - Potential short-term adverse effects, with long term maintenance of indicator (short term is considered to be the duration of the project, generally 1 year or less, but possibly intermittently up to 3 years).

X<sup>2</sup> - Potential short-term adverse effects, with long term restoration of indicator

X<sup>3</sup> - Possible degrade in the long-term as a result of no action.

X<sup>4</sup> - Short-term maintenance of the indicator, with long-term restoration

Effects are based on which way this project is likely to move the relevant indicator, but no change in baseline condition is expected.

CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF PROPOSED ACTION(S) ON RELEVANT INDICATORS AT THE **PROJECT LEVEL - Alternative 3 (Cable Yarding Only)**

**Administrative Unit:** Salem District BLM

**5th field watershed:** Dairy Creek

**Project:** Powerline Dairy Timber Sale

**6th Field watershed:** Upper East Fork Dairy Creek

FACTORS  INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)		
	Properly Functioning	At Risk	Not Properly Functioning	Restore	Maintain	Degrade
<u>Water Quality:</u>		X			X	
Temperature						
Turbidity			X	X <sup>2</sup>		X <sup>2</sup>
Chem. Contam./Nut.		X			X	
Overall (303d reaches)		X			X	
<u>Habitat Access:</u>			X		X	
Physical Barriers						
<u>Habitat Elements:</u>	X				X <sup>1</sup>	X <sup>1</sup>
Substrate/Sediment						
Large Woody Debris (LWD)		X			X	
Pool Area %			X		X	
Pool Quality			X		X	
Pool Frequency		X				
Off-Channel Habitat			X		X	
<u>Channel Cond. &amp; Dyn.:</u>	X				X	
Streambank Condition						
Floodplain Connectivity		X			X	
<u>Watershed Condition:</u>			X	X <sup>2</sup>		X <sup>2</sup>
Road Des. & Loc.						
Disturbance History			X		X	
Stream Influence Zone			X		X	
Refugia		X			X	

X<sup>1</sup> - Potential short-term adverse effects, with long term maintenance of indicator (short term is considered to be the duration of the project, generally 1 year or less, but possibly intermittently up to 3 years).

X<sup>2</sup> - Potential short-term adverse effects, with long term restoration of indicator

X<sup>3</sup> - Possible degrade in the long-term as a result of no action.

X<sup>4</sup> - Short-term maintenance of the indicator, with long-term restoration

Effects are based on which way this project is likely to move the relevant indicator, but no change in baseline condition is expected.



CHECKLIST FOR DOCUMENTING ENVIRONMENTAL BASELINE AND EFFECTS OF PROPOSED ACTION(S) ON RELEVANT INDICATORS AT THE **PROJECT LEVEL - Alternative 4 (Helicopter Yarding)**

**Administrative Unit:** Salem District BLM

**5th field watershed:** Dairy Creek

**Project:** Powerline Dairy Timber Sale

**6th Field watershed:** Upper East Fork Dairy Creek

FACTORS  INDICATORS	ENVIRONMENTAL BASELINE			EFFECTS OF THE ACTION(S)		
	Properly Functioning	At Risk	Not Properly Functioning	Restore	Maintain	Degrade
<u>Water Quality:</u> Temperature		X			X	
Turbidity			X	X <sup>4</sup>	X <sup>4</sup>	
Chem. Contam./Nut.		X			X	
Overall (303d reaches)		X			X	
<u>Habitat Access:</u> Physical Barriers			X		X	
<u>Habitat Elements:</u> Substrate/Sediment	X				X	
Large Woody Debris (LWD)		X			X	
Pool Area %			X		X	
Pool Quality			X		X	
Pool Frequency		X			X	
Off-Channel Habitat			X		X	
<u>Channel Cond. &amp; Dyn.:</u> Streambank Condition	X				X	
Floodplain Connectivity		X			X	
<u>Watershed Condition:</u> Road Des. & Loc.			X	X <sup>2</sup>		X <sup>2</sup>
Disturbance History			X		X	
Stream Influence Zone			X		X	
Refugia		X			X	

X<sup>1</sup> - Potential short-term adverse effects, with long term maintenance of indicator (short term is considered to be the duration of the project, generally 1 year or less, but possibly intermittently up to 3 years).

X<sup>2</sup> - Potential short-term adverse effects, with long term restoration of indicator

X<sup>3</sup> - Possible degrade in the long-term as a result of no action.

X<sup>4</sup> - Short-term maintenance of the indicator, with long-term restoration

Effects are based on which way this project is likely to move the relevant indicator, but no change in baseline condition is expected.

The baseline condition of the habitat elements is based on a 1994 BLM habitat survey on approximately 3 miles of stream in the Upper East Fork Dairy Creek 6<sup>th</sup> field watershed.

## **Water Quality**

**Temperature:** Temperature data is limited in the upper watershed, however the lower portions of Dairy and McKay Creeks are 303d listed for exceeding water temperature standards. There is a possibility that the 7 day average maximum water temperature exceeds 68EF during the peak water temperature period. **At Risk.**

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained**.

**Alternative 2:** No-cut buffers on all streams and a very limited thinning within RR (approximately 16 acres) would maintain canopy cover over the stream and in riparian areas, therefore water temperature would be **Maintained**.

**Alternative 3:** Same as Alternative 2.

**Alternative 4:** Same as Alternative 2.

**Turbidity:** The incidence of bank erosion is high in the 5<sup>th</sup> field watershed from multiple sources, thus the frequency and magnitude of turbidity is likely greater than would occur in similar unimpacted streams (Washington Co. SWCD and BLM 1999). Many gravel-surfaced roads and natural surface roads are suspected to be chronic sources of sediment/turbidity depending on the location and maintenance. **Not Properly Functioning.**

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained**. A possible exception to this is the log culvert in unit 33-3 that would be removed in all 3 action alternatives. The log culvert will eventually fail, resulting in additional sediment into the stream, causing some amount of turbidity, causing at least a short-term **Degrade** of this indicator.

**Alternative 2:** Log yarding and hauling, and road building/decommissioning activities may result in short-term sediment input leading to increased turbidity. Road decommissioning following timber harvest would result in a net reduction of road mileage (800 feet) within the watershed, which would reduce long-term potential for sedimentation by increasing infiltration. A log culvert would have the fill removed and the channel recontoured, which may increase turbidity in the short-term, but would eliminate the eventual failure of this culvert which would result in additional sediment into the stream, causing turbidity. The following actions would minimize or eliminate sediment movement into streams: limited thinning within RR (approximately 16 acres), no-cut buffers on perennial and intermittent streams, generally no ground-based yarding within RR except where logging equipment is able to operate from an existing road, and roads generally located on benches and ridgetops. Though there is a potential for short-term increases in sediment input to streams, increasing turbidity, the long-term effect would be a decrease in sedimentation due to subsoiling of roads and removal of the log culvert. Short-term **Degrade**, Long-term **Restore**.

**Alternative 3:** The impacts of Alternative 3 would be similar to those of Alternative 2 with the following exceptions: all road and timber harvest activities would be limited to the dry season, the amount of new road construction is approximately half of that in Alternative 2, no ground-based yarding would occur, and unit 33-1(the regeneration harvest unit) would not be harvested. The potential for increased turbidity is less than in Alternative 2, however there still would be a short-term **Degrade** with a long-term **Restore** of this indicator.

**Alternative 4:** The impacts of Alternative 4 would be similar to those of Alternative 2 with the following exceptions: all road and timber harvest activities would be limited to the dry season, there would be 1,250 feet of new road construction (approximately 30% of what would be constructed in Alternative 2) and no road reconstruction, road decommissioning following timber harvest would result in a net reduction of 3,000 feet of road within the watershed, and a helicopter would be used for yarding timber. There is a potential for short-term increases in sediment input to streams leading to an increase in turbidity, however this potential is negligible. The long-term effect would be a decrease in sedimentation and turbidity due to subsoiling of roads and removal of the log culvert. Short-term **Maintain**, long-term **Restore**.

**Chemical Contamination/Nutrient Input:** Chemical contamination and nutrients are a problem within the Dairy Creek 5<sup>th</sup> field watershed, however all 303d listed reaches are located downstream of the Upper East Fork of Dairy Creek 6<sup>th</sup> field watershed. **At Risk.**

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained**.

**Alternative 2:** The Proposed Action would not have any effect on chemical or nutrient contamination, this indicator will be **Maintained**.

**Alternative 3:** Same as Alternative 2.

**Alternative 4:** Same as Alternative 2.

**Overall (303d reaches):** Portions of the watershed are on the ODEQ 303d list for e-coli, temperature, low dissolved oxygen and low pH, however all 303d listed reaches are located downstream of the Upper East Fork of Dairy Creek 6<sup>th</sup> field watershed. **At Risk.**

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained**.

**Alternative 2:** The Proposed Action would not have any effect on chemical or nutrient contamination, nor would it add or remove any 303d listed reaches, therefore this indicator will be **Maintained**.

**Alternative 3:** Same as Alternative 2.

**Alternative 4:** Same as Alternative 2.

## **Habitat Access**

**Physical Barriers:** Migration of fish is known to be fully or partially blocked at culverts on tributary streams within the watershed. **Not Properly Functioning.**

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained**.

**Alternative 2:** No culverts or other fish passage barriers would be removed as a result of this action, therefore this indicator would be **Maintained**.

**Alternative 3:** Same as Alternative 2.

**Alternative 4:** Same as Alternative 2.

## **Habitat Elements**

**Substrate/Sediment:** Gravel makes up the major substrate in surveyed riffle habitat, while sand and silt combined make up only 3% and 6% of the primary and secondary substrate respectively. **Properly Functioning.**

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained**. A possible exception to this is the log culvert in unit 33-3 that would be removed in all 3 action alternatives. The log culvert will eventually fail, resulting in additional sediment into the stream, causing at least a short-term **Degrade** of this indicator.

**Alternative 2:** Log yarding and hauling, and road building/decommissioning activities may result in short-term sediment input to streams. Road decommissioning following timber harvest would result in a net reduction of road mileage (800 feet) within the watershed, which would reduce long-term potential for sedimentation by increasing infiltration. A log culvert would have the fill removed and the channel recontoured, which may increase sediment input to the stream in the short-term, but would eliminate the eventual failure of this culvert which would result in additional sediment into the stream. The following actions would minimize or eliminate sediment movement into streams: limited thinning within RR (16 acres), no-cut buffers on perennial and intermittent streams, generally no ground-based yarding within RR except where logging equipment is able to operate from an existing road, and roads generally located on benches and ridgetops. Though there is a potential for short-term increases in sediment input to streams, the long-term effect would be a decrease in sedimentation due to subsoiling of roads and removal of the log culvert. No change in substrate composition, other than the possibility of increased sediment is anticipated. Short-term **Degrade**, Long-term **Maintain**.

**Alternative 3:** The impacts of Alternative 3 would be similar to those of Alternative 2 with the following exceptions: all road and timber harvest activities would be limited to the dry season, the amount of new road construction is approximately half of that in Alternative 2, no ground-based yarding would occur, and unit 33-1 (the regeneration harvest unit) would not be harvested. The potential for increased sedimentation is less than in Alternative 2, however there still would be a short-term **Degrade** with a long-term **Maintain** of this indicator.

**Alternative 4:** The impacts of Alternative 4 would be similar to those of Alternative 2 with the following exceptions: all road and timber harvest activities would be limited to the dry season, there would be 1,250 feet of new road construction (approximately 30% of what would be constructed in Alternative 2) and no road reconstruction, road decommissioning following timber harvest would result in a net reduction of 3,000 feet of road within the watershed, and a helicopter would be used for yarding timber. There is a potential for short-term increases in sediment input to streams, however this potential is negligible. The long-term effect would be a decrease in sedimentation due to subsoiling of roads and removal of the log culvert. **Maintain.**

**Large Woody Debris:** The three miles surveyed contained only one piece of large wood (defined as 24 inches in diameter and at least 1.5 times the mean channel width in length), though small wood pieces were fairly abundant. The tributaries adjacent to the treatment units have not been surveyed, however observations during fish presence/absence surveys indicate there is currently an adequate amount of large wood in these channels on BLM land. **At Risk.**

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained**.

**Alternative 2:** No-cut buffers on all streams and a very limited thinning within RR (16 acres) would maintain the current and future sources of large wood to the stream. **Maintain.**

**Alternative 3:** Same as Alternative 2.

**Alternative 4:** Same as Alternative 2.

**Pool Area %:** The surveyed reaches contain 7% area in pools. **Not Properly Functioning.**

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained.**

**Alternative 2:** No-cut buffers on all streams and a very limited thinning within RR (16 acres) would maintain the current and future sources of large wood to the stream, which is the main pool-forming element. No other portion of this alternative would alter the amount of pools within the watershed. **Maintain.**

**Alternative 3:** Same as Alternative 2.

**Alternative 4:** Same as Alternative 2.

**Pool Quality:** The surveyed reaches contain 8% of pools that are at least 1 meter in depth. Pool quality is **Not Properly Functioning.**

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained.**

**Alternative 2:** No-cut buffers on all streams and a very limited thinning within RR (16 acres) would maintain the current and future sources of large wood to the stream, which is the main pool-forming element. No other portion of this alternative would alter the amount of quality pools within the watershed. **Maintain.**

**Alternative 3:** Same as Alternative 2.

**Alternative 4:** Same as Alternative 2.

**Pool Frequency:** Data from the surveyed reaches indicate that the average distance between pools is 12 channel widths. Pool frequency is **At Risk.**

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained.**

**Alternative 2:** No-cut buffers on all streams and a very limited thinning within RR (16 acres) would maintain the current and future sources of large wood to the stream, which is the main pool-forming element. No other portion of this alternative would alter the pool frequency within the watershed. **Maintain.**

**Alternative 3:** Same as Alternative 2.

**Alternative 4:** Same as Alternative 2.

**Off-Channel Habitat:** Off-channel habitats make up 0.2% of the available habitat in the surveyed reaches. **Not Properly Functioning.**

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained.**

**Alternative 2:** No-cut buffers on all streams and a very limited thinning within RR (approximately 16 acres) would maintain the current and future sources of large wood to the stream, which may help provide off-channel habitat. No portion of the action would result in a reduction of off-channel habitat. **Maintain.**

**Alternative 3:** Same as Alternative 2.

**Alternative 4:** Same as Alternative 2.

### **Channel Conditions**

**Streambank Condition:** Observations during the habitat survey, while conducting fish presence/absence surveys and other field visits indicate that streambanks are **Properly Functioning** (Washington Co. SWCD and BLM 1999).

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained**.

**Alternative 2:** No-cut buffers on all streams and a very limited thinning within RR (approximately 16 acres) would eliminate any impacts to streambanks from logging activities. Removal of the log-culvert and recontouring the channel would have an impact on a very small portion streambank, which would recover quickly. Overall, streambank condition would be **Maintained**.

**Alternative 3:** Same as Alternative 2.

**Alternative 4:** Same as Alternative 2.

**Floodplain Connectivity:** The habitat survey data show a lack of large wood which would reduced the connections between the streams in the watershed and its floodplain, however observations within the project area show adequate large wood in most stream channels. **At Risk**.

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained**.

**Alternative 2:** No-cut buffers on all streams and a very limited thinning within RR (approximately 16 acres) would maintain the current and future sources of large wood to the stream and floodplain, which improves floodplain connectivity. Removal of the log culvert fill and recontouring the channel may help improve floodplain connectivity in a small portion of the watershed. **Maintain**.

**Alternative 3:** Same as Alternative 2.

**Alternative 4:** Same as Alternative 2.

### **Watershed Conditions**

**Road Density and Location:** Road densities are in excess of the 3 miles per square mile at the 5<sup>th</sup> field watershed scale. The Dairy Creek Watershed averages 4.28 miles of road/mile<sup>2</sup> with road densities over 12 miles/mile<sup>2</sup> in the Hillsboro area (Washington Co. SWCD and BLM 1999). Road density has not been calculated at the 6<sup>th</sup> watershed scale, however it is suspected to exceeded 3 miles/mile<sup>2</sup>. **Not Properly Functioning**.

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained**.

**Alternative 2:** Road density will be slightly increased for the duration of the project due to new road construction, however decommissioning at the end of the action would result in a small net decrease in road mileage (800 feet). New roads are generally located on benches and ridgetops. A small amount of the new road would be within RR in units 33-1 and 33-2, however these segments are located on ridgetops and alternate locations outside of RR would have resulted in mid-slope roads with greater potential adverse impacts. This indicator will be **Degraded** in the short-term but **Restored** in the long-term.

**Alternative 3:** This Alternative would have the same impacts on road density as Alternative 2, except the temporary increase in road mileage would be approximately half of that in Alternative 2, the road new road in RR in unit 33-2 would be temporary (constructed, used and decommissioned in the same season), and the road in RR in unit 33-1 would not be constructed. This indicator will be **Degraded** in the short-term but **Restored** in the long-term.

**Alternative 4:** This Alternative would have the similar impacts on road density as Alternative 2, except the temporary increase in road mileage would be approximately 30% of that in Alternative 2, the net decrease in road mileage would be 3,000 feet, and there would be no road construction within RR. This indicator will be **Degraded** in the short-term but **Restored** in the long-term.

**Disturbance History and Stream Influence Zone:** Farming and urban development have disturbed the riparian vegetation in the lower watershed while timber harvest and access roads have been developed in the upper portions of the watershed. Riparian areas are not providing adequate large wood and other “natural functions” (Washington Co. SWCD and BLM 1999).

**Not Properly Functioning.**

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained**.

**Alternative 2:** No-cut buffers on all streams and a very limited thinning within the outer portion of RR (approximately 16 acres) would result in no disturbance to stream influence zones. Unit 33-1 is a regeneration harvest unit, however the other units 33-2 and 33-3, which make up the bulk of the project area are commercial thinning unit, which will result in the watershed remaining relatively intact on federal land. Road decommissioning after timber harvest will help reduce any disturbance created through the action. **Maintain.**

**Alternative 3:** Impacts are similar to those of Alternative 2, except that unit 33-1 would be dropped, resulting in no regeneration harvest occurring, and less new road would be constructed. Road decommissioning after timber harvest will help reduce any disturbance created through the action. **Maintain.**

**Alternative 4:** Impacts similar to those of Alternative 2 except there would be less new road built and a greater net decrease in road mileage than in Alternatives 2 or 3. **Maintain.**

**Refugia:** Off-channel habitat is limited, there is a lack of large woody debris, and channel modifications such as straightening and channelization have reduced the major wetlands. However, some wetland and portions of the riverine habitats still exist and are still considered to be functioning (Washington Co. SWCD and BLM 1999). **At Risk.**

**Alternative 1:** Since Alternative 1 is the “No Action” alternative all matrix indicators would be **Maintained**.

**Alternative 2:** No-cut buffers on all streams and a very limited thinning within RR (approximately 16 acres) would buffer aquatic and riparian habitat and maintain the current and future sources of large wood to the stream and floodplain, which help **Maintain** refugia.

**Alternative 3:** Same as Alternative 2.

**Alternative 4:** Same as Alternative 2.

**Reference:**

Washington County Soil and Water Conservation District and USDI Bureau of Land Management. 1999. Dairy-McKay Creek Watershed Analysis. 125pp + appendices.

Oregon Department of Fish and Wildlife. 1993-1994. Stream Habitat Surveys - upper portions of East Fork Dairy and McKay Creeks. Aquatic Inventories Project, ODFW Research and Development.



## **APPENDIX 7.**

### **Documentation of Consistency with Aquatic Conservation Strategy Objectives of the Powerline Dairy Project Alternatives**

**ACS Objective 1.** Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.

**Alternative 1:** The current distribution, diversity and complexity of watershed and landscape-scale features would be maintained. **Does not retard or prevent the attainment of ACS Objective 1.**

**Alternative 2:** Unit 33-1 would be regeneration harvested and replanted with western redcedar, red alder and bigleaf maple, which would increase (restore) the species diversity. All merchantable hardwoods and an additional 20 trees per acre would be retained for wildlife trees and to provide snags and CWD, increasing habitat diversity and complexity (WA, p. 111). Thinning in units 33-2 and 33-3 would maintain and help increase (restore) diversity and complexity by encouraging development of understory species and growing larger trees. The 16 acres of thinning within RR may help **restore** species composition and structural diversity within the riparian zone, by promoting development of grass, forb, shrub and understory tree development, and increased individual tree growth resulting from this treatment would allow some trees to express dominance over others, enhancing the development of vertical structure in the stand as well (WA, p. 111). Leaving portions of RR untreated would increase diversity by providing a contrast to the treated portions. For example, thinned portions will provide larger trees sooner while the unthinned portions will provide more, but smaller snags through time. **Does not retard or prevent the attainment of ACS Objective 1.**

**Alternative 3:** Same as Alternative 2, except Unit 33-1 would not be harvested, therefore the stand's current diversity and complexity would be maintained. **Does not retard or prevent the attainment of ACS Objective 1.**

**Alternative 4:** Same as Alternative 2. **Does not retard or prevent the attainment of ACS Objective 1.**

**ACS Objective 2.** Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. The network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian dependent species.

**Alternative 1:** The current condition of connectivity would be maintained. **Does not retard or prevent the attainment of ACS Objective 2.**

**Alternative 2:** A small percentage of the RR within the project area would be thinned, which would increase the quality of the Riparian Reserve stand habitat by creating some larger trees, as well as insure that these stands can withstand the increased wind velocities they are likely to experience when the adjacent Matrix stands are eventually regenerated (WA, p. 111). The connectivity would be maintained in the short term and increasing the windfirmness of trees in RR will help maintain connectivity in the long term. No-cut buffers on all perennial and intermittent streams will ensure that connectivity would be maintained among all drainages by maintaining canopy cover over streams and maintaining connections of RR on federal land (WA, p.109, 111). Removal of a log culvert would help restore connectivity within the drainage network of the watershed (WA, p.109). **Does not retard or prevent the attainment of ACS Objective 2.**

**Alternative 3:** Same as Alternative 2. **Does not retard or prevent the attainment of ACS Objective 2.**

**Alternative 4:** Same as Alternative 2. **Does not retard or prevent the attainment of ACS Objective 2.**

**ACS Objective 3.** Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

**Alternative 1:** The current condition of the physical integrity of the aquatic system would be maintained. **Does not retard or prevent the attainment of ACS Objective 3.**

**Alternative 2:** Only a small percentage of the RR would be treated and no-cut buffers on all perennial and intermittent streams would ensure that the physical integrity of the aquatic system would be maintained (WA p. 109, 111). Removal of a log culvert and recontouring the stream channel would help restore physical integrity to the stream channel at that location (WA p.109). **Does not retard or prevent the attainment of ACS Objective 3.**

**Alternative 3:** Same as Alternative 2. **Does not retard or prevent the attainment of ACS Objective 3.**

**Alternative 4:** Same as Alternative 2. **Does not retard or prevent the attainment of ACS Objective 3.**

**ACS Objective 4.** Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

**Alternative 1:** The current condition of water quality would be maintained. A possible exception to this is the log culvert in unit 33-3 that would be removed in all 3 action alternatives. The log culvert will eventually fail, resulting in additional sediment into the stream, causing at least a short-term degradation of the water quality within the drainage. **Does not prevent the attainment of ACS Objective 4; May retard attainment if the log culvert fails.**

**Alternative 2:** Timber harvest activities, including road construction, reconstruction and decommissioning, and yarding and hauling timber, could lead to sediment movement into streams in the short-term. Roads are mainly located on benches and ridgetops, which reduces potential for runoff and sediment movement. Road decommissioning will result in a small net reduction of road mileage within the watershed (800 feet) and removal of a log culvert which will eventually fail would reduce long-term potential for sedimentation and help restore water quality (WA p. 109). The Proposed Action is expected to have little to no impact on stream temperatures because of the untreated reserves (no-cut buffers) adjacent to the streams and the retention of about 60% of the trees and 59% of the basal tree area in the harvested portions of the RR (WA p. 109). **Does not retard or prevent the attainment of ACS Objective 4.**

**Alternative 3:** Same as Alternative 2, except that in Alternative 3 there is approximately 50% less new road construction, cable logging only and dropping the regeneration unit (33-1), which would result in less ground disturbance than in Alternative 2. **Does not retard or prevent the attainment of ACS Objective 4.**

**Alternative 4:** Same as Alternative 2, except that in Alternative 3 there is approximately 70% less new road construction, no road reconstruction, and a greater net reduction of road mileage (3,000 feet). Utilizing a helicopter yarding system would result in less ground disturbance than either Alternative 2 or 3. This alternative would maintain and help restore water quality within the watershed. **Does not retard or prevent the attainment of ACS Objective 4.**

**ACS Objective 5.** Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.

**Alternative 1:** The current condition of the sediment regime would be maintained. A possible exception to this is the log culvert in unit 33-3 that would be removed in all 3 action alternatives. The log culvert will eventually fail, resulting in additional sediment into the stream, causing at least a short-term disruption of the sediment regime in a portion of the watershed. **Does not prevent the attainment of ACS Objective 5; may retard attainment if the log culvert fails.**

**Alternative 2:** There is a low risk that a small amount of sediment could move from the harvest area within the Riparian Reserves in unit 33-3 into a surface water due to cable yarding 5.5 acres of RR during wet soil conditions. If that occurred, the sediment delivery impacts would small and short termed. The probability of sediments entering streams from roads is low due to: 1) the long distance between the roads and streams; 2) the filtering effects of untreated reserves around the streams (WA p. 109); 3) the design features of the roads; and 4) water-barring, and subsoiling the roads upon completion of the project (WA p.109). Very little new road construction would occur within the RR (WA p.110), and existing roads would be only temporarily reconstructed. The roads to be constructed in RR would be located on ridgetops; alternate locations outside of RR would result in a mid-slope roads with greater potential for adverse impacts. Decommissioning roads within the watershed would contribute to the restoration of the sediment regime, and sedimentation in these channels would be expected to decrease below existing conditions (WA p. 109). **Does not retard or prevent the attainment of ACS Objective 5.**

**Alternative 3:** The current condition of the sediment regime would be maintained. There would be in less ground disturbance and lower risk of sedimentation in this alternative than Alternative 2 because 1) all timber harvesting would be cable yarded and conducted during low soil moisture conditions; 2) smaller area harvested; and 3) about 50% less new road construction. **Does not retard or prevent the attainment of ACS Objective 5.**

**Alternative 4:** The current condition of the sediment regime would be maintained. This alternative result would cause the least ground disturbance because it would be logged by helicopter and there would about 70% less new road construction. **Does not retard or prevent the attainment of ACS Objective 5.**

**ACS Objective 6.** Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.

**Alternative 1:** The current condition of in-stream flows would be maintained. **Does not retard or prevent the attainment of ACS Objective 6.**

**Alternative 2:** The treatment will take place mainly outside Riparian Reserves and the treatment within Riparian Reserves is minimal. The watershed is rain dominated, the area to be harvested is small 0.02% (92.2 acres) of the Upper East Fork Dairy Watershed with only 22.4 acres to be regeneration harvested. The road density in the watershed would be slightly reduced (WA p. 109). Thus timber harvesting and road construction or reconstruction will have no impact on in-stream flows and they will be maintained. **Does not retard or prevent the attainment of ACS Objective 6.**

**Alternative 3:** Same as Alternative 2. No regeneration harvest would occur, but the result is that the current condition of in-stream flows would be maintained. **Does not retard or prevent the attainment of ACS Objective 6.**

**Alternative 4:** Same as Alternative 2. **Does not retard or prevent the attainment of ACS Objective 6.**

**ACS Objective 7.** Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.

**Alternative 1:** The current condition of floodplain inundation and water tables would be maintained. **Does not retard or prevent the attainment of ACS Objective 7.**

**Alternative 2:** The current condition of floodplain inundation and water tables would be maintained. No ground disturbing activities would occur in meadows and wetlands. Compacted surfaces on adjacent hillslopes would be minimized by adhering to design features and management directives listed in Chapter 2 of the EA and by the subsoiling of landings, skid trails, roads and “legacy” roads in the watershed (WA p. 109). The road density in the watershed would be slightly reduced. **Does not retard or prevent the attainment of ACS Objective 7.**

**Alternative 3:** Same as Alternative 2. **Does not retard or prevent the attainment of ACS Objective 7.**

**Alternative 4:** Same as Alternative 2. Reduction in road density would be greater than in Alternatives 2 and 3. **Does not retard or prevent the attainment of ACS Objective 7.**

**ACS Objective 8.** Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

**Alternative 1:** The current condition of plant communities within riparian areas would be maintained. **Does not retard or prevent the attainment of ACS Objective 8.**

**Alternative 2:** No-cut buffers along streams (both perennial and intermittent) will maintain thermal regulation and supply nutrients, LWD, and bank protection (WA p. 109, 111). The 16 acres of thinning within RR may help **restore** species composition and structural diversity within the riparian zone by promoting development of grass, forb, shrub and understory tree layers of vegetation. This fact coupled with an increased individual tree growth and crown development resulting from this treatment would enhance the development of vertical structure within the stand (WA p. 111). **Does not retard or prevent the attainment of ACS Objective 8.**

**Alternative 3:** Same as Alternative 2. **Does not retard or prevent the attainment of ACS Objective 8.**

**Alternative 4:** Same as Alternative 2. **Does not retard or prevent the attainment of ACS Objective 8.**

**ACS Objective 9.** Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species.

**Alternative 1:** The current condition of habitat to support riparian-dependent species would be maintained. **Does not retard or prevent the attainment of ACS Objective 9.**

**Alternative 2:** No-cut buffers along streams (both perennial and intermittent) will maintain the habitat for riparian-dependent species. The 16 acres of thinning within RR may help **restore** species composition and structural diversity within the riparian zone by promoting development of grass, forb, shrub and understory tree layers of vegetation. This fact coupled with an increased individual tree growth and crown development resulting from this treatment would enhance the development of vertical structure within the stand (WA p. 111). Leaving portions of RR untreated would increase diversity by providing a contrast to the treated portions. For example, thinned portions will provide larger trees sooner while the unthinned portions will provide more, but smaller snags through time. Thinning would help insure that these stands can withstand the increased wind velocities they are likely to experience when the adjacent Matrix stands are regenerated (WA p. 111). The habitat would be maintained in the short term and increasing the windfirmness of trees in RR will help maintain riparian habitat in the long term. **Does not retard or prevent the attainment of ACS Objective 9.**

**Alternative 3:** Same as Alternative 2. **Does not retard or prevent the attainment of ACS Objective 9.**

**Alternative 4:** Same as Alternative 2. **Does not retard or prevent the attainment of ACS Objective 9.**

WA = Dairy-McKay Watershed Analysis (Washington Co. SWCD and BLM, 1999)

APPENDIX 8 -

**Biological Evaluation  
For Special Status Plant Species/Survey & Manage Species And Noxious  
Weeds**

**Project name:** Powerline Dairy Timber Sale (thinning and regeneration harvest)

**Legal Description:** T4N R3W Sec. 33

**Preparer/Title:** Suzanne DiGiacomo/Botanist/Tillamook Resource Area.

**Date Prepared:** 9/99

**I. PREFIELD REVIEW (Level 1 Clearance)**

**A. General habitat description:**

**Acres:**Unit 33-1: 20 acres  
Unit 33-2: 14 acres  
Unit 33-3: 61 acres

**Elevation Range:** 1340-1740 ft.

**Habitat:**

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Mixed conifer/deciduous forest of Douglas-fir, western hemlock, and red alder  
Patches of red alder in wet areas  
Disturbed ground beneath the powerline, brushy  
Streams: Dairy creek and many of its tributaries

**Surveys completed in the vicinity of the proposed action:**

No known surveys have been completed in this area.

**Known sites in the vicinity of the proposed action:**

No known sites in vicinity.

**Recommended season of reconnaissance:**

Lichens and bryophytes: no snow  
Vascular plants: April - August  
Fungi: March-June, October-December

**II. FIELD RECONNAISSANCE (Level 2 Clearance)**

Survey Date	Surveyor(s)	Unit
6/98	L. Scofield	33-2
7/27/98	L. Scofield, S. Jansen	33-3 NW
8/24/98	L. Scofield, M. Yost, S. Jansen	33-3

8/25/98	L. Scofield, M. Yost, S. Jansen	33-1
10/14/98	L. Trabant	33-2
10/15/98	L. Trabant	33-3 SW
5/12/99	S. DiGiacomo, T. Fennell	33-3
5/24/99	S. DiGiacomo, T. Fennell	33-3, 33-2
6/11/99	S. DiGiacomo, T. Fennell	33-1

Protocols utilized for botanical S & M include: Survey Protocol for *Bondazewia mesenterica* (=B. montana), *Otidea leporina*, *O. onotica*, *O. smithii*, *Polyozellus muliplex*, *Sarcosoma mexicana*, and *Sowerbyella* (=Aleuria) *rhenana*. Version 1.2 by Thomas E OEDell, October 1999; Survey Protocols for Protection Buffer Bryophytes. Version 2.0, December 1999; Survey Protocols for Survey and Manage Strategy 2 Vascular Plants. Version 2.0, December 1998; and Survey Protocols for Component 2 Lichens. Version 2.0, March 12, 1998.

**Special Status Species Found:** none

**Survey and Manage Species Found:**

<u>Species</u>	<u>Location</u>	<u>Unit</u>	<u>Status</u>	<u>Type</u>
<i>Antitrichia curtispindulata</i>	all units	SM4		moss
<i>Lobaria oregana</i>	SE 1/4 SW 1/16	33-3	SM4	lic
<i>Cantharellus formosus</i>	SW 1/4 SE 1/16	33-3	SM1,3	hen fun
	NE 1/4 SE 1/16	33-1		gi
<i>Clavulina cristata</i>	SW 1/4 SE 1/16	33-3	SM3,4	fun
<i>Cudonia monticola</i>	SE 1/4 SE 1/16	33-2	SM3	gi fun
<i>Gyromitra esculenta</i>	SE 1/4 SE 1/16	33-2	SM3,4	gi fun
<i>Omphalina ericetorum</i>	NE 1/4 SE 1/16	33-2,3	SM3,4	gi fun
<i>Plectania melastoma</i>	NE 1/4 SE 1/16	33-1	SM3	gi fun
	SW 1/4 SE 1/16	33-3		gi
<i>Sarcosoma mexicana</i>	SW 1/4 SE 1/16	33-3	SM3,PB	fungi

**Noxious Weeds/Invasive Exotics found:**

*Cirsium arvense*  
*Cirsium vulgare*  
*Hypericum perforatum*  
*Senecio jacobaea*

**Description of project area and general remarks on survey results:**



Unit 33-1: The unit has a south/southwest aspect, an elevation range of 1340-1620 feet, a moderate slope, and is bounded to the north, south, and west by flowing creeks. The overstory is comprised of predominantly 70 year old Douglas-fir (*Pseudotsuga menziesii*) with scattered red cedar (*Thuja plicata*) and western hemlock (*Tsuga heterophylla*). Red alder (*Alnus rubra*) forms occasional patches and is common along riparian areas and roads. The shrub layer is dominated by salal (*Gaultheria shallon*), vine maple (*Acer circinatum*), dwarf Oregon grape (*Berberis nervosa*), and red huckleberry (*Vaccinium parvifolium*). Vascular plant diversity is limited due to the thick shrub cover, and is the greatest along the creeks.

Unit 33-2: The unit has a west/southwest aspect, an elevation range of 1460-1720 feet, a moderate to gentle slope, and is bounded to the north and south by flowing creeks. These creeks were not diverse botanically. The stand is fairly homogenous with an overstory comprised of predominantly 70 year old Douglas-fir (*Pseudotsuga menziesii*) and patches of overstory red alder (*Alnus rubra*). The shrub cover is generally thick and comprised of mostly salal, vine maple, dwarf Oregon grape, and sword fern, with salal being most abundant.

Unit 33-3: The unit is just over half a mile long and has a variety of slopes and aspects. The elevation ranges from 1360 to 1700 feet. A creek runs north to south along the western border of the unit. The stand is fairly homogenous with an overstory comprised of predominantly 70 year old Douglas-fir (*Pseudotsuga menziesii*) and patches of overstory red alder (*Alnus rubra*). Shrub cover is generally thick except for occasional patches near the center of the stand under vine maple. The shrub layer is comprised of mostly salal, vine maple, dwarf Oregon grape, and sword fern, with salal being most abundant. A road and powerline run through the northern portion of the unit as do several overgrown skid trails. Stumps were present throughout the stand.

### III. IMPACT ANALYSIS

#### Survey and Manage Species:

The S&M 4 species *Antitrichia curtipendula* was common throughout the stand, especially in moist and riparian areas. *Lobaria oregana* (S&M 4) appeared to be restricted to the southern portion of unit 33-3, especially where the red alder was abundant.

To date, unit 33-2 and the southern part of 33-3 are the only units to be surveyed for fall fungi. *Cantharellus formosus* was found in 3 locations in units 33-1 and 33-3, *Plectania melastoma* and *Omphalina ericetorum* were found in several locations, *Clavulina cristata* was found in 1 location in unit 33-3, and one *Gyromitra esculenta* was located on the road cut adjacent to unit 33-2. All of these fungi are frequently found throughout the Salem district and can be expected to be common in this area. One *Cudonia monticola* was located near the periphery of unit 33-2 in the Riparian Reserve area, and one *Sarcosoma mexicana* was found in unit 33-3. *Sarcosoma mexicana* is a protection buffer fungi that is often found in the Salem district. Other sites are likely to exist in the project area, however only one site was located.

**Noxious Weeds/Invasive Exotics:** All of the noxious weeds and all except for one invasive exotic identified during the field survey(s) of the Powerline Dairy T.S. area are common roadside weed species. These weed species are commonly found throughout western Oregon, tending to occupy areas of high light and ground disturbance (i.e. road corridors and fields). An increase in the overall number of these species will likely occur immediately following any ground disturbing or light increasing activity associated with the planned timber sale. In time, these species will again return to their low levels as the native vegetation returns to these areas.

#### IV. ANALYSIS OF SIGNIFICANCE OF EFFECTS

##### **Survey and Manage Species:**

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Information is currently being gathered regarding strategy 4 species but no special protection efforts are required for these species.

The proposed project would not be expected to impact the viability of the S&M 3,4 fungi; *Plectania melastoma*, *Omphalina ericetorum*, *Gyromitra esculenta*, or *Clavulina cristata*. These fungi are abundant across the district and can be expected to be common outside of the proposed harvest areas. *Plectania melastoma* in particular was very abundant within the sale boundaries, and so it is unlikely that its entire population will be impacted by the planned activities. None of these species are restricted to old growth, and can often be found in early second growth. *Gyromitra esculenta* is commonly found in disturbed habitats such as road cuts. As such, no special protection is recommended for these species. *Cudonia monticola* is an uncommon species that grows in the debris layer left by conifers. Thus, it may be threatened by activities that disturb the litter layer or large-scale removal of conifer trees.

The S&M 1,3 species *Cantharellus formosus* is abundant throughout the Salem district and is commonly found in disturbed, second-growth habitats. In the Management Recommendations for Survey and Manage Fungi (pg. 5-2), *C. formosus* is stated as being a candidate for removal from Survey and Manage listing and no special management efforts are recommended.

Although common across the district, *Sarcosoma mexicana* was only found in one location in the project area. Thus, it may suffer adverse impacts from the proposed action.

Provided the recommendations in section V are followed, the following effects could be expected.

Alternative 1 (No action): No adverse impacts to the survey and manage species found in these units would be expected to occur under this alternative. None of the species found are restricted to a single ecological condition and so are not dependent upon management of forest stands to maintain their habitats.

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Alternative 2 (Proposed Action): In this alternative, cable and ground-based yarding would occur. Ground-based yarding can be expected to disturb the litter layer, soil, and woody debris to a greater extent than would cable yarding. Because all of

the survey and manage fungi found grow in those substrates, they could be negatively impacted. However, only a few specimens were found in areas scheduled to be ground yarded, and those species that were, had redundant sites in the cable yarding areas. Therefore, most of these species may suffer losses of individuals, but due to their abundances within the area their populations are expected to remain viable. Although only one site each of *Sarcosoma mexicana* and *Cudonia monticola* were found (neither was in the ground-based yarding area), the proposed recommendations should be sufficient to protect them from adverse impacts.

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Alternative 3 (Cable Yarding): Cable yarding creates less ground disturbance than does ground-based yarding and so is less likely to damage the sites of survey and manage fungi found in the project area. Most of these species may suffer losses of individuals, but due to their abundances within the area their populations are expected to remain viable. Additionally, because *Cantharellus formosus* and *Plectania melastoma* were found in unit 33-1, the exclusion of that unit from this alternative would act as a refugia for those species in the unlikely event that their other sites were destroyed or otherwise adversely impacted. Although only one site each of *Sarcosoma mexicana* and *Cudonia monticola* were found, the proposed recommendations should be sufficient to protect them from adverse impacts. Finally, fewer acres would be affected with this alternative than with alternatives 2 or 4. The combination of less ground disturbance and fewer acres manipulated also creates less of an opportunity for the spread of exotic species.

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Alternative 4 (Helicopter Yarding): This alternative will provide the least amount of ground disturbance and thus be the least detrimental for the fungi species encountered. Most of these species may suffer losses of individuals, but due to their abundances within the area their populations are expected to remain viable. Although only one site each of *Sarcosoma mexicana* and *Cudonia monticola* were found, the proposed recommendations should be sufficient to protect them from adverse impacts. Because safety considerations require large buffers be placed around the powerlines, the site of *Cudonia monticola* may actually be located outside of the unit in this alternative. Additionally, fewer linear feet of road would be constructed with this alternative. This provides less disturbed ground for the established weeds in the area to colonize.

**Noxious Weeds:** No appreciable increase in the noxious weeds/invasive exotics identified during the field surveys is expected to occur. Withing the thinning units, any increase that does occur should be mostly confined to road corridors and decrease over time as native species revegetate. Under Alternative 2 and 4 a regeneration harvest is proposed in unit 33-2. Weeds would be expected to move from the road corridors into this area, but again should decline once the area revegetates.

## **V. RECOMMENDATIONS**

1. All earth moving equipment is to be cleaned and free of soil, brush, weeds and any part thereof before entering BLM lands to prevent the spread of any noxious weed species.
2. The precise position of the *Cudonia monticola* was not relocated in the field. Therefore, in order to provide adequate protection, yarding corridors should not be allowed to intersect the general area of the sighting as to minimize

ground disturbance. This area will be marked on the ground with a buffer of 40 feet in radius from the approximate location of the *Cudonia monticola*. Because the sighting was located within the Riparian Reserve, fewer trees per acre will be removed than in the rest of the unit. This will also serve to lessen potential impacts

3. A buffer of 1-2 standing live trees deep should be placed around the site of *Sarcosoma mexicana* in unit 33-3. No activity should take place within this buffer (including falling trees within it) to insure that the coarse woody debris and litter layer should be left undisturbed as this is the substrate of the fungus. Burning should not be allowed in this area as the species does not tolerate fire.
4. Although no protocols currently exist for the majority of fungi species and we are not required to survey for them, fall fungi surveys are strongly recommended for at least one season. This allows a practical attempt at locating many of the other species of concern, and provides a basic level of survey coverage should management requirements change in the future

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**SIGNATURE**

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**DATE**

**Addendum to the Biological Evaluation  
For Special Status Plant Species/Survey & Manage Species And Noxious  
Weeds in Powerline Dairy Timber Sale**

**Preparer/Title:** Suzanne DiGiacomo/Botanist/Tillamook Resource Area

**Additional Survey Dates:**

Survey Date	Surveyor(s)	Unit
11/6/99	T. Fennell, A. Roux, K. Scott	33-3
11/10/99	S. DiGiacomo	33-1, 33-2
11/20/99	M. Lowery, T. Fennell, A. Roux	33-3
12/11/99	M. Lowery, T. Fennell, A. Roux	33-3

**Special Status Species found:** none

**Survey and Manage Species Found:**

<u>Species</u>	<u>Location</u>	<u>Unit</u>	<u>Status</u>
<i>Otidea onotica</i>	Sec 33 SE1/4 SW 1/16	33-3 PB	

**IMPACT ANALYSIS**

**Survey and Manage Species:**

Three individuals of *Otidea onotica* were found within the far southern portion of unit 33-3. The western most site may in fact be outside of the unit boundary.

**ANALYSIS OF SIGNIFICANCE OF EFFECTS**

**Survey and Manage Species:** *Otidea onotica* is thought to be mycorrhizal or saprophytic with some Pinaceae spp. Therefore specific threats to the taxa may come from removal of overstory trees, and soil, duff and litter disturbance. Aggregating leave trees, maintaining coarse woody debris, and minimizing disturbance are all recommendations found within Appendix J2 of the FEIS. Although this particular species is still listed in the new Survey and Manage SEIS expected to be adopted in summer 2000, it is being found with increasing frequency. On the Tillamook Resource Area alone, 32 sites were found in the fall 1999 survey season. The Powerline Dairy sale also has two units that have yet to be surveyed which may provide additional locations of *Otidea onotica*. As such the proposed action is not expected to result in the extirpation of the *Otidea onotica* populations within the project area. If the following recommendations are followed the following might be expected to occur.

Alternative 1 (No action): No adverse impacts to the survey and manage species found in this unit would be expected to occur under this alternative. The *Otidea onotica* individuals found are not restricted to a single ecological condition and so are not dependent upon management of forest stands to maintain their habitats.

Alternative 2 (Proposed Action): In this alternative, cable and ground-based yarding would occur. Ground-based yarding can be expected to disturb the litter layer, soil, and woody debris to a greater extent than would cable yarding. Because *Otidea onotica* grows in these substrates, it could be negatively impacted. However, only one specimen was found in an area scheduled to be ground yarded, and is likely out of the unit. There were also redundant sites in the cable yarding areas. Therefore, the species may suffer losses of individuals, but due to its abundance within the area the populations are expected to remain viable.

Alternative 3 (Cable Yarding): Cable yarding creates less ground disturbance than does ground-based yarding, and so has less of a potential to damage the sites of survey and manage fungi found in the project area. Because some acres would be dropped under this alternative, the western population of *Otidea onotica* would no longer be at risk from the logging activity. The remaining two sites may suffer losses but the populations are expected to remain viable.

Alternative 4 (Helicopter Yarding): This alternative will provide the least amount of ground disturbance, however all sites could be potentially impacted. If impacts do occur to the western most population, they are expected to be very small due to the recommended protection measure. The remaining sites may suffer losses of individuals, but overall populations in the area are expected to remain viable.

**RECOMMENDATIONS:**

1. A one site tree potential height radius no-entry buffer shall be placed around the western most *Otidea onotica* site (collection #991120-PD-4).
2. A 75 foot radius buffer shall be placed around the eastern most *Otidea onotica* site (collection #991120-PD-3) or two smaller radius buffers (50 to 70 feet) shall be placed around each of the eastern sites (collection #991120-PD-3 and #991120-PD-4).



APPENDIX 9 -

**Public Comments to the Environmental Assessment OR-086-99-03  
and Bureau of Land Management Responses.**

*(Reserved)*